AVIATION WEEK

JAN. 26, 1953

A McGRAW-HILL PUBLICATION

50 CENTS

Grumman

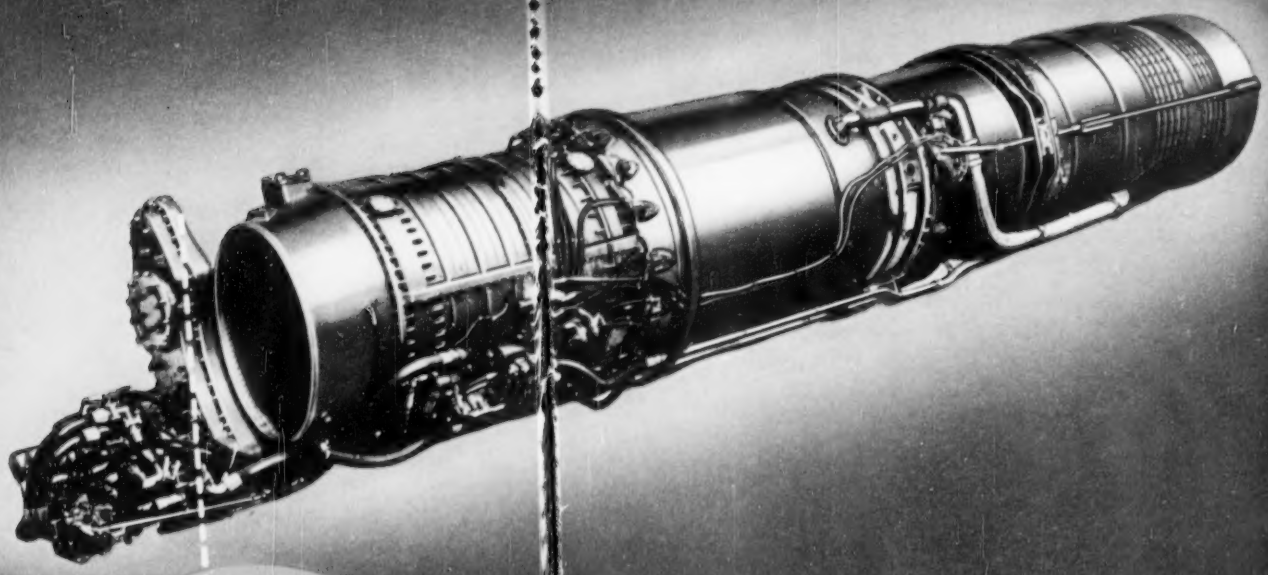
NEW "CAT" IN THE SKY

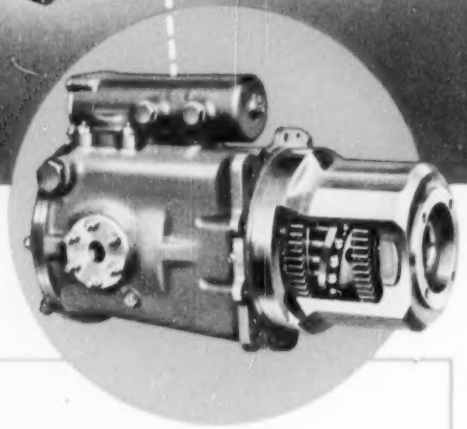
Now the COUGAR, a sleek, swept-wing successor to the battle proved PANTHER, takes its place in a long line of famous Grumman fighters. Ruggedness and reliability are inherent in this newest turbo-jet. These are traditional Grumman characteristics that Navy and Marine pilots have used to advantage since early World War II days when WILDCATS were clawing Jap Zeros.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION, BETHPAGE, LONG ISLAND, NEW YORK

Contractors to the Armed Forces

Sundstrand Constant Speed Drive now integral part of J-40 turbo-jet engine





"INTEGRAL TYPE" DRIVE LIGHT, COMPACT, EFFICIENT

- Mounted within the engine gear box achieving the desirable ratio of one KW power output per pound of drive weight.
- Location simplifies installation and maintenance of drive and accessories.
- Unit maintains its high efficiency even at extremely high altitudes.
- Constant speed maintained within ± ½ of 1% during normal operating conditions.

Used for driving aircraft accessories at constant speed

First engine to provide Sundstrand Constant Speed Drives for aircraft accessories as an integral part of the engine is the Westinghouse J-40. Light in weight, compact in design, and mounted into the engine gear box, the Sundstrand Drive assures substantial savings for the aircraft designer. Since it uses engine oil, no separate oil reservoir or cooler is required. It maintains constant speed for driving one or more accessories over the entire range of engine speeds, from idling to full military power. Sundstrand is proud to be associated with the Air Force, Navy, and Westinghouse in developing this integral part of one of the world's most powerful turbo-jet engines. It is another result of Sundstrand's *reliable* research, *expert* engineering, and *precision* production.

SUNDSTRAND

SUNDSTRAND AIRCRAFT HYDRAULICS

SUNDSTRAND MACHINE TOOL CO.
HYDRAULIC DIVISION, ROCKFORD, ILL.

AIRCRAFT AND INDUSTRIAL HYDRAULIC TRANSMISSIONS, PUMPS, MOTORS AND VALVES • OIL BURNER PUMPS • AIR SANDERS
LATHES • MILLING, BROACHING AND SPECIAL MACHINES • BROACHING TOOLS • MAGNETIC CHUCKS

B.F.Goodrich

B. F. Goodrich high-speed tire lands 1238 mph Skyrocket

NAVY'S DOUGLAS SKYROCKET has flown faster than any other piloted aircraft. Announced speed record: 1238 miles per hour.

Bringing it down to earth called for tires with giant strength. They had to be small to retract into close space in the fuselage. And strong to take an impact load of 8 tons, resist the terrific heat of 200 mph landings.

Other makes of tires had failed to meet specifications for this assignment. B. F. Goodrich engineers came up with both nose and main wheel tires that have even given more landings than required. They cushion the landing impact with 200 lbs. air pressure, yet main wheel tires are only 24" high, 5½" wide. Nosewheel tires are 20" high, less than 4½" wide.

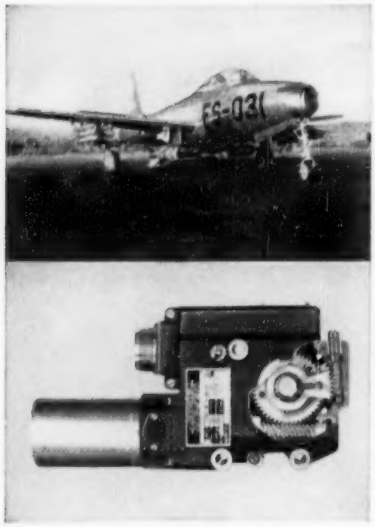
These tiny tires are typical of BFG's long record of engineering development on high pressure airplane tires —from the first high pressure tires for Navy carrier landings about 24 years ago to the new, revolutionary high-speed tire that lands planes at 250 mph. The first low pressure airplane tire was also a B. F. Goodrich development.

Other BFG products for aviation include wheels and brakes, De-Icers, heated rubber, Avtrim, Plastilock adhesives, Pressure Sealing Zippers, inflatable seals, fuel cells, Rivnuts, accessories. *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

B.F.Goodrich

FIRST IN RUBBER

Jato Release on Republic's F-84 AIRBORNE Actuated



The R-424 actuator (R-450 type) jettisons six Jato bottles after take off. The R-424 winds cables on a drum and pulls the pins.

This cutaway of Airborne's Model R-450 actuator shows the externally adjustable positive stops which, in conjunction with torque-limiting switches, provide accurate positioning at both extremes of travel. The limit may be at any value to 270°.

Projection of the splined output shaft, on both sides of the actuator, helps adapt the model R-450 to any application. The weight of this unit, with radio noise filter, is 2.7 pounds—the speed, at 26 volts and 250 pound-inch load, is 5 rpm.

See our insert in the I.A.S. Aeronautical Engineering Catalog for details on this and other Airborne actuators.

AIRBORNE
ACCESSORIES CORPORATION
1414 Chestnut Avenue Hillside 5, New Jersey

Aviation Week

ABP Member

Volume 58 **January 26, 1953** **Number 4**

Headline News

Europe to Go All-Out for Aircoach... 14
Chance Vought Builds Last Corsair.. 16
U. S. Disagrees on Air Damages..... 17
Vandenberg Speaks at IAS Dinner.. 17
Continental's New 225-Hp. Engine... 18
Aviation Sales Reported to SEC..... 18
Finletter Appeal 19
Boeing Tops in Aviation Contracts... 19
Seek Shorthaul Copter Standard..... 20
NACA Opens Lab for Giant Jets..... 22

Equipment Engineering

Probe-and-Drogue Inflight Refueling.. 26

Avionics

Remote VHFs to Speed N. Y. Traffic.. 38

Financial

Carrier Dividends Reach New High.. 46

Production

New Approach to Big Press Design.. 50

Aviation Safety

CAA Blasted on Tower Hazard..... 15
NACA Crash Tests..... 74

Air Transport

CAB OKs NWA B-377 77
Air Cargo Boom Forecast..... 78
Copter Cargo Between Airports..... 79
N. Y. Air Traffic Exceeds Target..... 80
CAB May Decide Pacific Case..... 81
ACTA Appoints Prill..... 81
U. S., Philippines Seek Air Pact..... 82

Editorials

Watch Those British!..... 94
Thought for the New Year..... 94

Departments

News Digest 7
Aviation Calendar 8
Picture Page 9
Industry Observer 10
Who's Where 10
Washington Roundup..... 13
Filter Center 42
Navy Contracts 52
New Aviation Products..... 60
What's New 71
Shortlines 92

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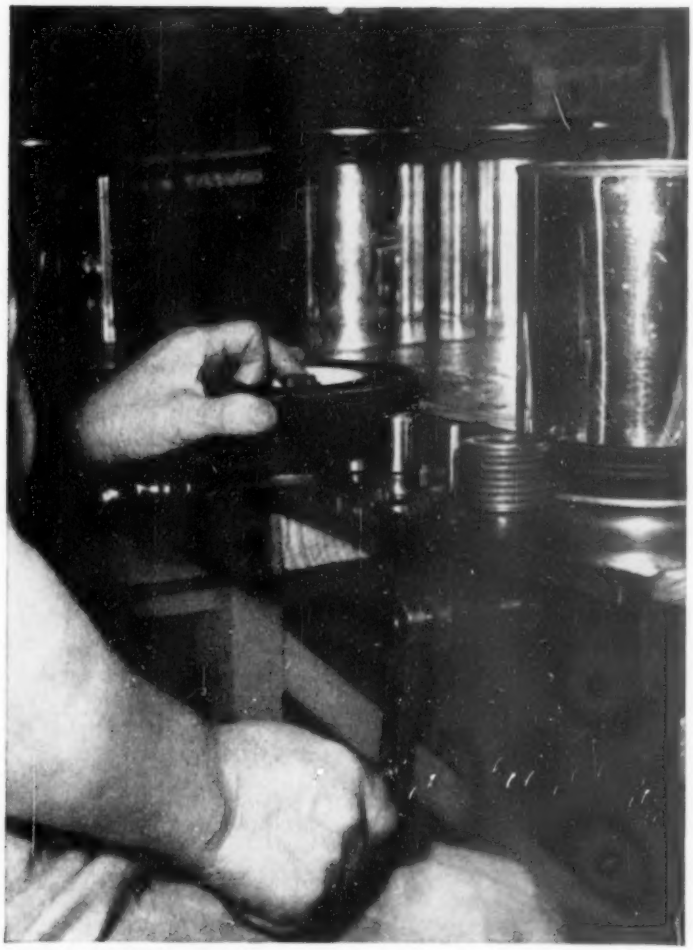
Tape helps Bendix "can" small aircraft parts



Polyken Tape No. 214 seals the lids on "canned" aircraft parts at these taping tables. Even the largest cans are sealed in approximately eight seconds.

Field mechanics at U. S. Navy and Air Force bases used to receive small repair parts packed together in cardboard cartons. This method did not provide perfect protection during shipping and left the unused parts exposed to damaging moisture and grit after the cartons were opened.

Bendix solved this problem by "canning" the parts in special tin containers—and sealing the lids with reusable Polyken Tape No. 214.

This Polyken Tape provides a strong, weatherproof seal that conforms to government specifications JAN-P-127, Type 1 Grade B. And because Polyken Tape No. 214 has excellent adhesion and tack, the same piece of tape that makes the original seal can be used again by merely pressing it back around the lid.

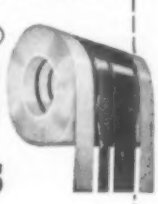
Now aircraft parts are protected until they're used.

This is just one of many packaging problems Polyken Tape has helped to solve. What's your problem? There's a Polyken Tape to solve it.

Write for free samples and information today

TAILORED TO YOUR JOB

Polyken®



INDUSTRIAL TAPES

Department of Bauer & Black
Division of The Kendall Company

Polyken, Dept. AWA, 222 West Adams St. Chicago 6, Ill.

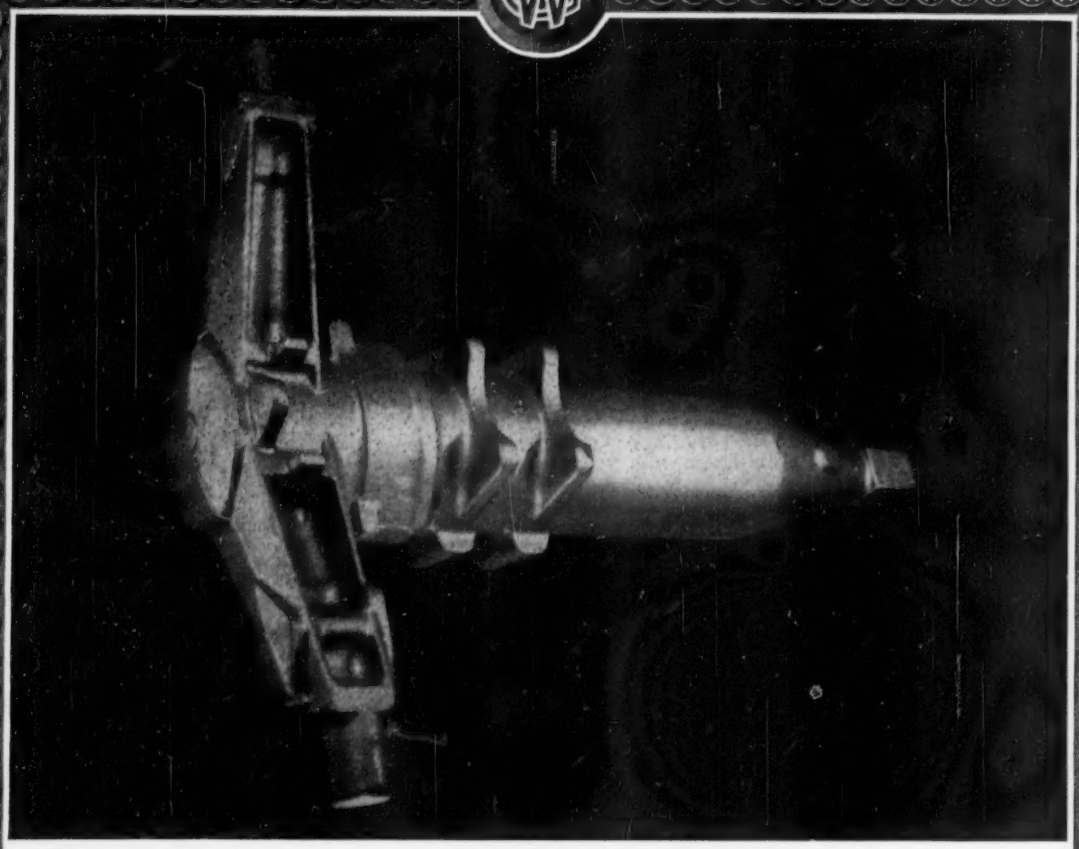
For specifications, samples, and further information on No. 214 and other Polyken tapes, please send me the *FREE BOOKLET*, "Tape is a Tool."

Name_____ Title_____

Company_____

Street Address_____

City_____ Zone____ State_____



Forgings for the aircraft industry today demand the utmost in engineering and production techniques and in scientific laboratory control. This massive complicated landing gear component, weighing over 400 pounds, is typical of Wyman-Gordon's forging contribution to the ever-growing progress in aircraft design. In crankshafts for the automotive industry and in all types of aircraft forgings, steel and light alloy, Wyman-Gordon has pioneered in the development of forging "know-how"—there is no substitute for Wyman-Gordon experience.

Standard of the Industry for More Than Sixty Years

WYMAN-GORDON

FORGINGS OF ALUMINUM • MAGNESIUM • STEEL

WORCESTER, MASSACHUSETTS

HARVEY, ILLINOIS DETROIT, MICHIGAN

NEWS DIGEST

Domestic

Defense Dept. canceled 460-plane military fly-by scheduled as part of last week's inauguration parade for President Dwight D. Eisenhower, following protests by the Aircraft Owners and Pilots Assn. that the flight would be unsafe.

National Airlines next week converts its entire coach service to DC-6s and expands nonstop New York-Miami coach to six roundtrips daily, three night and three day. Day coaches will seat 68. NAL is also converting its DC-6s to P&WA CB-16s turning high-activity Hamilton Standard props.

USAF has approved construction of a million-dollar addition to General Electric Co.'s Johnson City, N. Y., plant for complete controlled environmental testing of armament systems in new bombers.

First of CAA's new air surveillance radars (ASR-2) is scheduled to be commissioned at Newark Airport within the next 45 days. Built by General Electric, ASR-2 has greater coverage than older ASR-1 now in use, particularly at very high and very low altitudes.

Delos W. Rentzel, one-time chairman of Civil Aeronautics Board, has resigned as vice president of W. R. Grace Co. He did not disclose future plans in his resignation.

Gen. E. R. Quesada, USAF (Ret.), has been named to the board of governors of Flight Safety Foundation. Quesada, former commanding general of Tactical Air Command, is vice president and a director of Olin Industries.

Doman YH-31 cargo and evacuation helicopter may be used by Japanese Maritime Safety Corp. Doman says, "A considerable portion of our scheduled 1953 production has been reserved for Japan." Production is expected to rise to four copters monthly by the last quarter of 1953.

Dr. Leonard Carmichael, new secretary of the Smithsonian Institution, has been appointed a member of the National Advisory Committee for Aeronautics, succeeding Dr. Alexander Wetmore, retiring Smithsonian secretary.

Convair YB-60 eight-jet bomber has returned to the Ft. Worth plant following engine-thrust tests at Edwards AFB, Calif. It now is undergoing Phase 2 testing, expected to continue until approximately Apr. 1. A second YB-60 has been completed and is awaiting engine installation.

DEFENSE HEADS nominated by President Dwight D. Eisenhower are seen in Washington, D. C., awaiting examination by Senate Armed Services Committee. Left to right, seated: Robert T. Stevens, Secretary of the Army; Roger M. Kyes, Deputy Secretary of Defense; Charles E. Wilson, Secretary of Defense; Harold Talbott, Secretary of the Air Force. Standing, left, is Sen. Leverett Saltonstall, Armed Services Committee chairman, with Robert B. Anderson, Secretary of the Navy.

Fairchild Engine Division plants at Farmingdale and Valley Stream, N. Y., were struck Jan. 19 by members of UAW-CIO union, Local 661. Some 1,400 production and maintenance personnel walked out on a demand for wage increases and a union shop. Engineering departments at both plants were not affected by the strike, a Fairchild official said. Fairchild's Guided Missile and Stratos Divisions were not involved in the dispute, nor did it affect moving of equipment into Engine Division's new facility at Roosevelt Field, N. Y.

Mrs. Ann M. Archibald, 56, an assistant vice president of Pan American World Airways, died Jan. 17 in Washington, D. C. She joined PAA in 1929, three years after her husband was killed in a crash in Nicaragua. Mrs. Archibald received a Navy Certificate of Merit for her airline work during World War II.

Financial

Cleveland Pneumatic Tool Co. employes may acquire 100% ownership of the multi-million-dollar manufacturing firm through company-financed profit-sharing trusts. Adoption of the plan, proposed by company president Sam S. Mullin, will be decided this month by employe representatives.

Taylorcraft asked stockholders last week for approval of a stock split in an effort to increase market range of common shares. The plan would give stockholders two shares for each share now owned, dividing Taylorcraft's authorized capital stock of $1 million into 1 million shares which would have a par value of $1 per share.

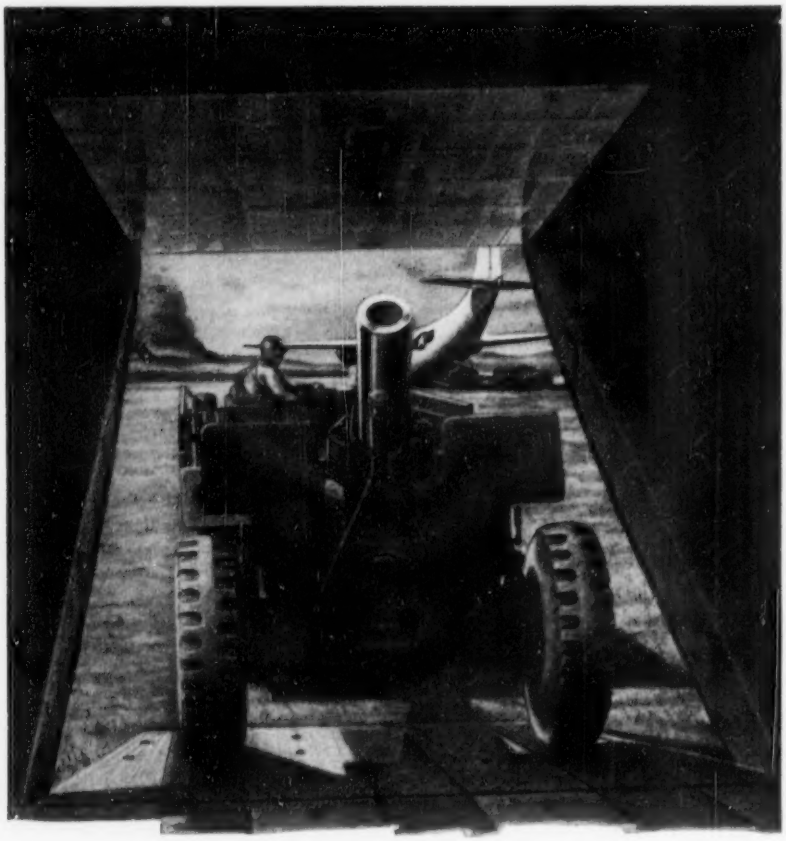
International

Air France has bought Curtiss-Wright's electronic flight trainer, the first to be purchased by a foreign airline in the United States. The trainer will be used at the carrier's headquarters near Paris for pilot refresher courses in navigation.

Lockheed Aircraft Service (international) has approved a new contract with International Assn. of Machinists providing a 16.7-cent-an-hour increase in wages and fringe benefits retroactive to Dec. 1, 1952.

Ambrosini's new Sagittarius delta-wing jet trainer made first test flight Jan. 5 at the Bressanone, Italy, airfield. The plane is powered by a Marbore Turbomeca jet engine with an estimated thrust of 900 lb.

Canadian Pacific Airlines has postponed until Apr. 28 inauguration of jet passenger flights between Honolulu and Sidney, Australia, because of a delay in delivery of Comet jet aircraft. The trans-Pacific service originally was scheduled to begin Mar. 13.



here's "HOW"...

Small unprepared fields – even in combat zones, present few difficulties to Chase Assault Transports. Heavy duty howitzers, with crews and prime movers are delivered to front line areas **by landing** ready for immediate employment – no time lost due to unpacking or reassembly.

The Chase Assault Aircraft is the only plane designed for this specific function and has more than fulfilled the exacting requirements of military necessity.

Chase AIRCRAFT CO., Inc.
WEST TRENTON, NEW JERSEY
STROUKOFF AVITRUC

AVIATION CALENDAR

Jan. 26-29—21st Annual Meeting of Institute of Aeronautical Sciences, Hotel Astor, N. Y. Honors Night dinner Jan. 26.

Feb. 10—Second seminar on industrial lubrication engineering, American Society of Lubrication Engineers, Bellevue-Stratford Hotel, Philadelphia.

Feb. 12-13—National Aviation Education Council annual meeting, Atlantic City, N. J.

Feb. 18—New York Section of the Instrument Society of America, Hotel Statler, New York, N. Y.

Feb. 18-19—Eighth Annual Conference of the Society of Plastics Industry, Reinforced Plastics Division, Shoreham Hotel, Washington, D. C.

Feb. 22-24—Texas' Second Agricultural Aviation Conference, Texas A & M College, College Station, Tex.

Mar. 10-11—Eleventh Annual Conference, Society of the Plastics Industry Canada, Inc., General Brock Hotel, Niagara Falls, Canada.

Mar. 17-20—21st Annual Meeting American Society of Tool Engineers, Hotel Statler, Detroit.

Mar. 23-25—Third Midwestern Conference on Fluid Mechanics, University of Minnesota, Minneapolis.

Mar. 23-26—Congress of Civil Aviation Conferences, Municipal Auditorium, Kansas City, Mo.

Mar. 23-26—Institute of Radio Engineers national convention, Waldorf-Astoria and Grand Central Palace, New York, N. Y.

Mar. 23-27—Eighth Western Metal Exposition and Congress, Pan-Pacific Auditorium, Los Angeles.

Mar. 23-28—Congress of Civil Aviation Conferences, a joint meeting of trade organizations; theme: 50 years of aviation progress. American Association of Airport Executives is holding annual meeting simultaneously, Kansas City, Mo. Contact convention manager, Ross C. Roach, P. O. Box 315, Kansas City 41, Mo.

Mar. 25-27—National Production Forum of the SAE, Hotel Statler, Cleveland, O.

Mar. 31-Apr. 2—First International Magnesium Exposition, National Guard Armory, Washington, D. C.

Apr. 4-12—Second Annual International Motor Sports Show, Grand Central Palace, New York, N. Y.

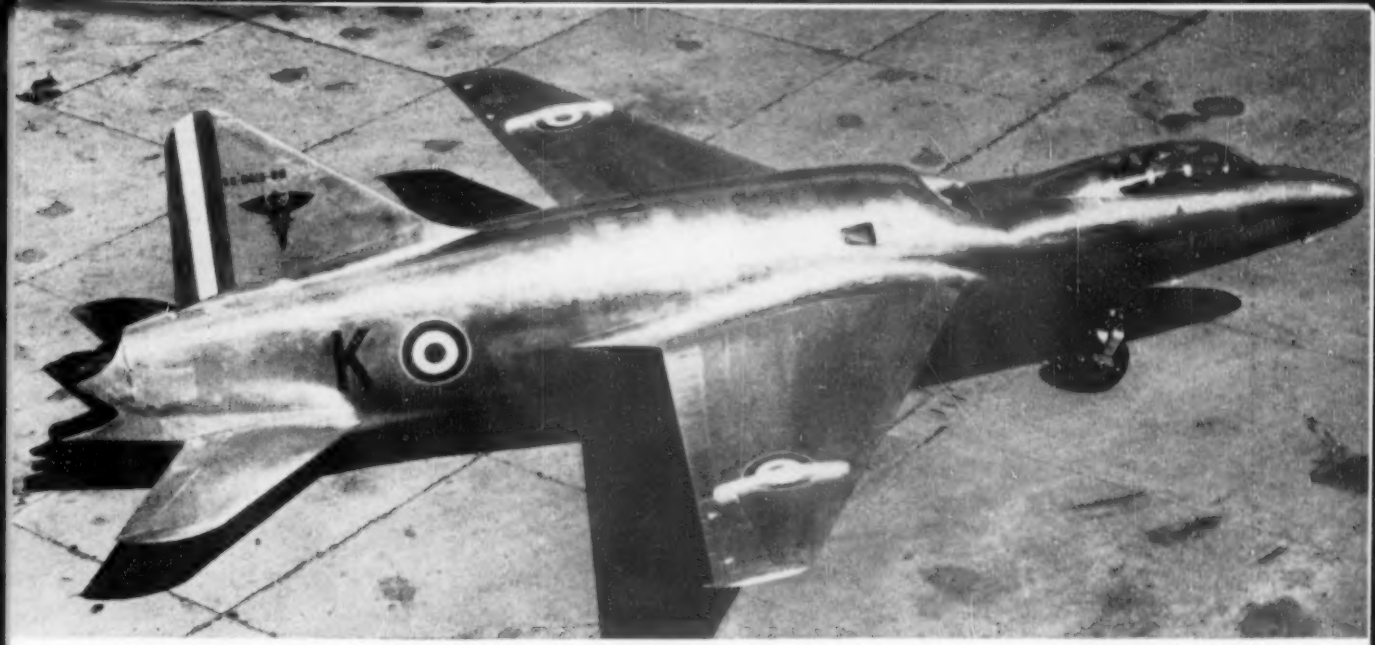
Apr. 20-23—Aeronautic Production Forum, National Aeronautic Meeting and Aircraft Engineering Display (SAE), Hotel Governor Clinton and Hotel Statler, New York, N. Y.

Apr. 29-May 1—1953 Electronics Components Symposium (AIEE-IRE), Shakespeare Club, Pasadena, Calif.

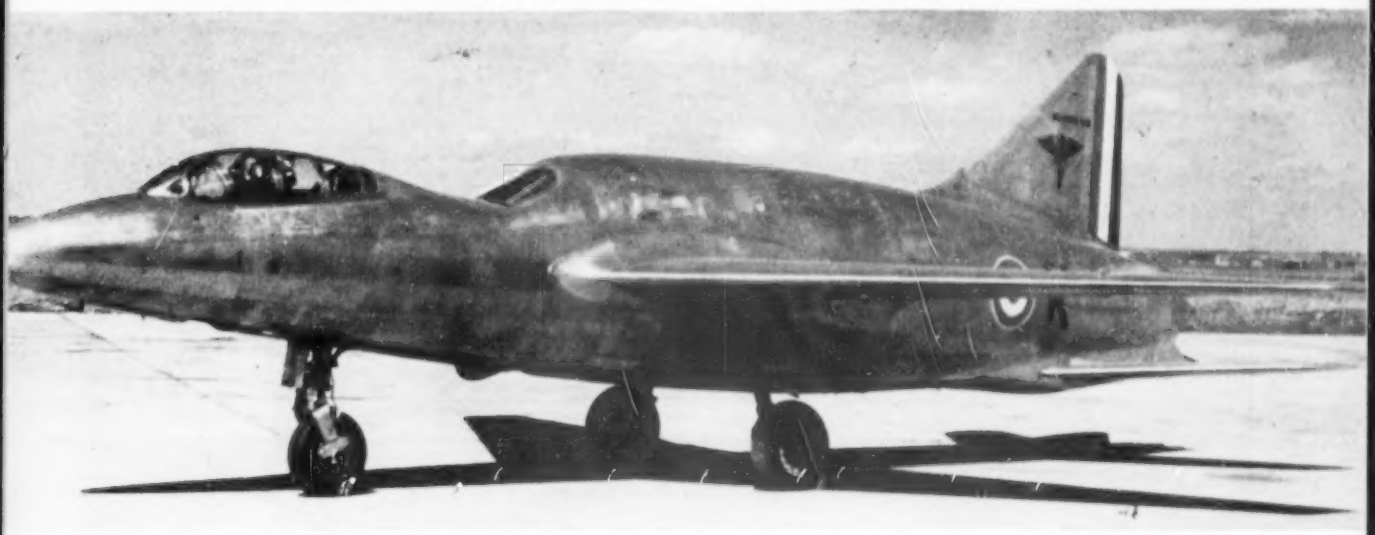
May 11-13—IRE National Conference on Airborne Electronics, Dayton Biltmore Hotel, Dayton, O.

PICTURE CREDITS

7—Wide World; 9—(top, center) Howard Levy; 17—(left) North American Aviation; (right) de Havilland Aircraft Co.; 20—Allison Division, General Motors; 20-21—NACA; 26—(top right) Flight Refueling, Inc.; (bottom left) Republic Aviation Corp.; (bottom right) Charles Brown; 27—(top right) Charles Brown; (lower right) Wide World; 74-75—NACA.



FRENCH JET FIGHTER—Above and below are first detailed views of the SE-2415-02 Grognard all-weather fighter which is powered by two Hiso Nene jets mounted one above the other in the fuselage with intakes just behind the cockpit. Wings are swept 32 deg.



WEIRD PROFILE—Odd fuselage configuration is highlighted in this view of the Grognard. Craft spans 51.10 ft., is 55.21 ft. long, 19.25 ft. high and has gross weight of 31,900 lb. It has attained Mach 0.835. Rate of climb is given as 5,314 fpm. and range as 645 mi.

New Jet Planes In the News

CESSNA 318 JET TRAINER—Sketch (left) of two-place side-by-side Cessna trainer which won a USAF design competition over 14 other entries. Powerplants are two Continental-Turbomeca Marbore 352, of 900 lb. thrust each which would give the craft a top speed of approximately 400 mph. (See Aviation Week Jan. 12, p. 15, for initial details of Model 318 project.)

INDUSTRY OBSERVER

► Chrysler's new missile contract is for production of the so-called Redstone, designed and developed by German engineers from the V-2 group at Peenemunde. This group, headed by Wernher von Braun, former technical director of Peenemunde, now is working at the Army Ordnance Redstone Arsenal, Huntsville, Ala. Chrysler will do its work on this surface-to-surface missile in the Navy-financed plant at Detroit, originally built to manufacture Pratt & Whitney J48 turbojets.

► Watch for Fairchild to flight test a special C-119 tanker equipped for aerial refueling. The tanker version of the Packet uses the Flight Refueling, Inc., system (see story on p. 26) with 12 internal fuel tanks. USAF plans to make all of its cargo transports available for aerial refueling.

► Navy also is pushing aerial refueling, particularly for its fighters. Latest Navy tanker will be the Convair XP5Y-1 turboprop flying boat, which will fly soon with aerial refueling rigs at both wingtips and at the tail to permit refueling three fighters simultaneously.

► McDonnell Aircraft Corp. has shelved commercial plans for its Little Henry XH-20 ramjet helicopter because of pressure of military business. Original plans called for building some for agricultural and industrial sales.

► Difficulties with its Westinghouse turbojet engines have been responsible for retarding the flight test program of the Douglas X-3 stub-wing supersonic research plane. Engines now installed in the X-3 are delivering considerably less power than the original specifications promised.

► A new version of the Napier Nomad compound Diesel-gas turbine engine will be installed in the Avro Shackleton patrol bomber late this year. The redesigned Nomad Mark 2 is expected to be lighter and have lower fuel consumption than the original version. Nomad-Shackletons probably will become standard RAF Coastal Command equipment.

► First fleetwide installation of distance measuring equipment (DME) will be made in DC-3s of Mohawk Airlines as part of a CAA and ANDB program to evaluate DME performance. CAA will lend Hazeltine airborne DME units to Mohawk for the experiment. Seven other airlines—American, United, Eastern, Capital, Northwest, PAA and TWA—have been loaned DMEs built by Federal Telecommunications Labs.

► Pentagon sources say the principal technical difficulty that disqualified the de Havilland Venom night fighter for the MSA off-shore procurement program (Aviation Week, Jan. 19, p. 15) is a tendency for one wing to drop as the aircraft approaches its critical Mach number.

► Piper Aircraft Corp. is planning to produce its new all-metal twin-engine PA-23 at the rate of two planes a day by early next year at Lock Haven, Pa. More than 300 flying hours have been accumulated on the PA-23. It is flying at 110 mph. fully loaded at 3,000 ft. on the power of one engine.

► Aircraft Industries Assn. has established a Guided Missiles Technical Committee to act for members in the missile business on common problems and to work with the military services in developing suitable procurement specifications and requirements.

► Mutual Security Agency has allocated $2,075,000 to The Netherlands and Greece for purchase of American aircraft parts and ground-handling equipment. Netherlands gets $2 million of the funds.

► Boeing Airplane Co. reports initial tests have been made on interchangeability of parts for B-47 Stratojets built by Boeing, Lockheed and Douglas and using stabilizer and tail fin assemblies built by the Crosley Division of Avco, Nashville, Tenn. USAF has specified that certain B-47 parts used by all three manufacturers must be interchangeable to simplify field maintenance of Stratojet bomber wings.

WHO'S WHERE

In the Front Office

E. B. Code, operations manager for West Coast Airlines, Boeing Field, Seattle, since the carrier started service in 1946, has been appointed vice president-public relations. **George Cooke**, WCA's general manager, has been named operations manager and **Tom Croson** has been designated sales manager.

Charles E. Marthens, operations manager for Rick Helicopters, Inc., has been elected vice president and member of the board of Alaska Helicopters, Inc., Anchorage, to fill the vacancy created by resignation of **John D. Shield**. The firms are affiliated.

J. Nugent Lopes has been appointed vice president-advertising and public relations for Gavco Corp., New York City, a subsidiary of General Aviation Corp. He formerly was public relations director for Crosley Division of Avco Mfg. Corp., Cincinnati, Ohio.

George G. Stier has been designated an assistant vice president of Nopco Chemical Co., Harrison, N. J. He will head the company's new Lockfoam Division, recently organized to handle foamed-in plastic material for the aviation industry. He will also handle and negotiate all military orders and contracts and the industrial market development department.

Donald R. Morse, formerly executive assistant to the vice president-finance, Curtiss-Wright Corp., has been named executive assistant to the president and general manager of Ronson Art Metal Works, Inc., Newark, N. J. **Jacob H. Gichner**, formerly in charge of the proximity fuse program for Navy's BuOrd, has been named director of engineering. **Thomas W. Coultas**, formerly assistant supervisor of North American Aviation's Material Division, has been appointed manager of Ronson's Special Products Division.

J. C. (Jack) Kuhn has been appointed vice president-sales of Atkins Saw Division of Borg-Warner Corp., Indianapolis, Ind. He previously held a similar post with Morse Twist Drill & Machine Co.

Alexander J. Lilly, chief test pilot for Canadair Ltd., Montreal, since 1946, has been named executive assistant to the vice president-sales and will also act as flight test advisor to the vice president-engineering.

Brig. Gen. George S. Cassady has been named deputy commander, Continental Division, Military Air Transport Service, Kelly AFB., Tex.

Changes

Allan F. Bonnalie, until recently president and general manager of Lamsa, UAL's former Mexican subsidiary, has been appointed to a newly created position as director of UAL's flight training department, which is being expanded and reorganized.

Paul W. Rhame, Allison assistant general manager, has been named general manager of New Departure Division of Gen-

(*Continued on page 92*)

Hamilton Standard, leader for years in propeller design and production, is supplying Hydromatic propellers for such outstanding aircraft as the Air Force's Chase C-123 assault transport.

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Cruzeiro do Sul (Brazil)
J.A.T. (Yugoslavia)
National
Philippine
Pioneer

Washington Roundup

New Start

The new Administration will start rolling with President Dwight D. Eisenhower's State of the Union message to Congress laying down fundamental policies that will guide its course.

Although the new command seems eager to move fast in many directions, it will take time to spell out specific, concrete recommendations to implement these generalities.

Three Truman recommendations affecting aviation, however, almost are certain to be included in the Eisenhower program:

• **Separation of airmail pay and subsidy** so Post Office Department won't have to bear the burden of airline support and can cut back its operating deficit, estimated at $669 million for the coming 1954 fiscal year. Airline subsidies, it is estimated, will account for $71 million of this total.

• **Hikes in postal rates** also will reduce Post Office's deficit by creating more revenue. Unless rates are raised, the deficit will exceed the half-billion-dollar mark for the sixth consecutive year. If subsidy is excluded from mail pay, domestic airmail service will be a profit operation for Post Office—a strong argument against a rate hike. Foreign airmail, however, will continue in the red and is a likelier recipient of a postal rate hike.

• **Continuation of President's authority** to reorganize government agencies, including Civil Aeronautics Administration and Civil Aeronautics Board. That authority expires Apr. 1. Senate Committee on Government Operations, headed by Sen. Joseph McCarthy, is ready to go on extension legislation. But Congress is expected to retain its authority over Defense Department organization.

Budget Cutters Start

House Appropriations Committee men, under leadership of veteran economy ax-wielder, Chairman John Taber, are taking up the ball and tackling the Federal Budget. They will work closely with new Budget Director Joseph Dodge but are not waiting on his recommendations.

Taber's determination: to cut back the $78.6 billion in expenditures for fiscal 1954 recommended in the Truman budget "to below $70 billion" and to cut "between $6 and $8 billion" off the $72.9 billion in new money proposed.

Policy meetings of the full committee will decide where the cuts are to be made.

Defense budget is one of Taber's chief targets. His comment:

"The military services are falling behind on their procurement programs and piling up the backlog of unexpended funds. There is an average of three years delay in deliveries, and we are spending too much money on obsolete equipment. We knew the services wouldn't be able to spend $46 billion this year, but they convinced so many gullible people that this ceiling would wreck the defense program and brought such pressure that we didn't go through with the limitation. Now, it develops, they will only be able to expend $42 billion. There is no sense giving them more money to pile up."

Aircraft procurement funds will be a major item in Taber's plan to cut down the $85 billion in unspent defense funds. Of this, approximately $30 billion is for aircraft and related procurement.

Key Money Men

Rep. Richard Wigglesworth, who sees eye-to-eye with Taber on money matters, will be chairman of the House Appropriations Subcommittee on the Armed Services. Taber is bypassing this chairmanship in favor of the chairmanship of the Subcommittee on Foreign Military Appropriations. But he still will keep his eye on the defense picture. He reports he intends to have "floater status" and keep tabs on the proceedings of all the appropriations subcommittees—particularly the Defense Subcommittee.

After the full committee has set the size and overall policies on the coming-year defense budget, the Defense Subcommittee will break up into three working groups to go into Army, Air Force and Navy details.

Military aviation is a top concern with Wigglesworth, who wants to go into these particular questions:

• Should we invest in large expensive strategic bombers or the less-expensive types?

• Are we procuring too many types of planes for the Navy and Air Force? Last spring, Wigglesworth launched congressional pressure on the military and Office of Defense Mobilization to cut down plane types.

• Do the high unit costs for initial plane production reflect too-high charges for amortization and overhead? His comment: "I have no confidence that some of the unit costs, such as those for planes, fire control, and radar, are anywhere near correct."

• Why the great difference in unit prices of planes of the same type bought by USAF and Navy? Under Wigglesworth's questioning last spring, Navy cited specialized missions requiring specialized equipment.

• Should we construct the large Forrestal-type carrier or rely exclusively on the less-expensive and smaller types?

Sen. Homer Ferguson, also a determined economizer, heads the Appropriations Subcommittee that will handle defense funds in the Senate. His record last year:

• **Supported a $600-million cut** in USAF plane procurement funds in Appropriations Committee, arguing that Air Force parts and equipment buying is excessive. Later, however, Ferguson went along with restoration of the money on the Senate floor.

• **Voted for a $68-million reduction** in USAF research and development funds. Cut was defeated.

• **Opposed proposals by Sen. Wayne Morse** for drastic cuts in USAF operating funds, however.

• **Voted to ban payments to Aro, Inc.,** to operate Arnold Engineering Development Center for USAF.

Ferguson headed the Investigating Committee that opened an investigation in 1947 into Howard Hughes' $18-million flying boat contract. Probe evolved into an airing of Hughes' charges that former Sen. Owen Brewster attempted to pressure a merger of TWA and PAA, subsequently, went into former Gen. Bennett Myers' activities as procurement chief at Wright-Patterson AFB.

CAA Money

A request for $4.6 million to enable Civil Aeronautics Administration to rehabilitate air navigation and other facilities at Wake Island, wrecked in last September's typhoon. It is pending before the House Appropriations Committee.

—**Katherine Johnsen**

AVIATION WEEK VOL. 58, NO. 4
JANUARY 26, 1953

Europe Plans All-Out Switch to Aircoach

- **Carriers await governmental approval of proposal to put 95% of service on tourist-fare basis.**
- **New fares even lower than coach level to be pushed by British independents for colonial flights.**

By Nat McKitterick
(McGraw-Hill World News)

London—What amounts to a Europe-wide fare cut of 20-30% will go into effect Apr. 1 on 95% of scheduled passenger air services in Europe, subject to approval of governments concerned, as European carriers plan an almost complete switch to aircoach.

British European Airways, Air France, KLM Royal Dutch Airlines, Swissair, Sabena and Scandinavian Airlines System—following decisions made last November at the International Air Transport Assn. European-Mediterranean conference at Cannes, France—plan to eliminate most first-class fares in favor of tourist rates.

▶ **More Seats, Less Baggage**—The only differences in services supplied under the new fare structure will be: (1) higher density seating; and (2) lower baggage allowance (33 lb. on short runs; 44 lb. on longer runs as against 66 lb. for all flights now). All airlines report they plan to serve refreshments and meals free on the new services as they do now. The present "off-peak" fare differential now in operation on most intra-European night flights will be retained under the new rate structure.

This mass conversion to tourist fares was spearheaded by BEA's chief executive, Peter Masefield (AVIATION WEEK Sept. 22, 1952, p. 16). Masefield is converting BEA to an almost 100% tourist-class carrier. His newest equipment, 26 four-turboprop Discoveries (Vickers Viscounts), first of which will enter service in March, will start right out carrying 47 tourist-class passengers on BEA's longer continental routes—Nice, Rome, Athens, Istanbul, Cyprus. Shorter routes will be flown by 47-passenger Elizabethans (de Havilland-Airspeed Ambassadors) and 36-passenger Vickers Vikings.

▶ **Luxury Service**—The only first-class services BEA is retaining at present are the luxury Silver Wing London-Paris and London-Nice. Further Silver Wing service between London and Zurich and London and Geneva may be started later to counter similar Swissair service.

Air France similarly will wipe out almost all its first-class services Apr. 1. Air France Viscounts will enter service as tourist carriers when the first of the dozen on order are delivered in early spring. But bulk of the traffic will be carried in 55-seat Douglas DC-4s. Air France will maintain its present luxury service between Paris and London but plans to replace its similar Nice-London service with an "in-between" fare service soon.

Sabena plans to convert to tourist on all except current first-class service Brussels-Rome and Brussels-Lisbon. Its tourist-class equipment will be 73-seat DC-6Bs and 40-seat Convair 240s.

▶ **Other Plans**—Swissair is keeping a first-class London-Zurich service but converting to tourist elsewhere. Equipment: 40-seat Convair 240s; 55-seat DC-4s, and 28-seat DC-3s. Swissair has Convair 340s on order.

KLM and SAS had not announced their tourist plans as of last week. But they can be expected to follow the general pattern. SAS at present plans to keep its first-class services between London and the Scandinavian capitals.

British Overseas Airways Corp. last week also announced plans to extend its tourist services outside of Europe. On Mar. 1, tourist service between London and Central Africa (terminating in Lusaka, Northern Rhodesia) will start. Apr. 1, tourist service will start between London and Singapore and Hongkong. At the same time, BOAC's first tourist services to the Middle East—Cairo, Beirut, Damascus, and Lod—will begin. Next October, BOAC plans to extend tourist services to India, Pakistan, and Ceylon, and to South Africa.

BOAC's tourist equipment on the Far East tourist services will be 56-seat Argonauts; on the Middle East services, 56-seat Hermes, and on the South African services, Constellations. Seating arrangement hasn't been fixed yet.

British independent operators let it be known last week they expect several announcements in about two weeks of new lower-than-tourist fare services between London and points in the British colonies. These colonial coach services were sanctioned by the British government last June as a sop to hard-pressed private operators whose scope of activity was badly limited by BOAC and BEA monopolies (AVIATION WEEK June 23, 1952, p. 78).

The Air Transport Advisory Council, whose job it is to screen all applications of private operators for new services, now has 18 proposals for new colonial coach services being taken under consideration.

▶ **Applicants**—Among the applications are four proposed jointly by Hunting Air Transport, Ltd., and Airwork, Ltd. They are for services between London and the Rhodesias; London and Malta; London and Gibraltar; and London and West Africa. Competing for the Gibraltar and West Africa franchises is Aquila Airways, Ltd., which now operates a flying boat service to the Madeira and Canary Islands. Aquila wants to use boats on the Gibraltar and West African runs. Also up for approval is a Lancashire Airways Corp. ("Skyways") proposal for a London-Jamaica colonial coach service.

Hunting Air Transport and Airwork operate jointly the only colonial coach service now running—a weekly service between London and Nairobi, Kenya. The companies report they have averaged a 90% load factor since start of operations last June. The fare is 35% below BOAC's first-class.

The service takes a leisurely two and a half days compared with 24 hrs. by BOAC. But this seems to have had little effect. Overnight stops are made en route at Malta and Mersa Matruh, Egypt. Equipment: Vickers Vikings.

New AEDC Head

Brig. Gen. Samuel Russ Harris, Jr., has been named head of USAF's Arnold Engineering Development Center, Tullahoma, effective Feb. 1. Gen. Harris is now Chief of Staff of Air Research and Development Command Hq., Baltimore. He succeeds Col. Charles K. Moore, who has been assigned to Tactical Air Command Hq., Langley Field.

Gen. Harris has served with the Air Force for 26 years. He was assigned in 1929 as a test pilot and aeronautical engineer at Wright Field and served there for nine years. In World War II he commanded a B-29 group in the Far East. A command pilot, Gen. Harris holds the Distinguished Service Medal and Distinguished Flying Cross.

Tall Towers

Pointing up the increasing problem of obstructions to air navigation are records of applications for erecting tall radio and television towers.

At the same Chicago Airspace Regional Subcommittee meeting that considered the Air Force water tower obstruction at Youngstown Airport, petitions for clearance were considered for construction of nine radio and television antenna towers proposed by broadcasting companies.

Box score of these other obstructions:

• **Approvals** were given for a 953-ft. tower at Bloomington, Ind., a 523-ft. tower at Canton, Ohio, and a group of 425-ft. towers at Grand Forks, N. D.

• **Disapproved** as aeronautical hazards were a 790-ft. tower at Grand Rapids, Mich., a 916-ft. tower at Milwaukee and a 1,044-ft. tower at Toledo, Ohio.

Approvals conditioned on reduction in height were given for a 1,053-ft. tower at Toledo, Ohio.

Approvals conditioned on reduction in height were given for a 1,053-ft. tower at Holly, Mich., and an 874-ft. tower at Steubenville, Ohio. Condition: The towers must not be any taller than 2,049 ft. above sea level.

Aviation Safety

CAA Blasted on Tower Hazard

Youngstown groups raise politics cry, as waiver is granted for tower that they call safety hazard.

By Alexander McSurely

U.S. aircraft operators, pilots and safety authorities last week watched a significant battle between federal authorities and civilian aviation over construction of a 146-ft. obstruction on a runway approach path at Youngstown (Ohio) Municipal Airport.

National importance of the conflict centered on a paradoxical situation which found Civil Aeronautics Administration, the designated defender of aviation safety, endorsing the hazard by a waiver against protests of Youngstown city officials who are backed by pilots and airlines.

The obstruction, a water tower built by the Army Corps of Engineers for the new USAF interceptor base at the airport, has been the target of repeated broadsides of angry charges by aviation users of the airport for the last several months.

▶**Cite Newark Case**—Charges that "CAA is playing politics with the safety of the people using the airport" and "is making up another Newark case for Youngstown" were published in a Youngstown Vindicator front-page story reporting that CAA had approved keeping the tower at its present height.

The CAA waiver approving the Army-constructed tower is hit as "playing with the lives of people using the airport and planes landing there," by Capt. A. L. Tucker, former CAA inspector and airline pilot, who now flies a Youngstown Sheet & Tube Co. executive plane.

CAA comes in for this latest public lambasting on two counts:

• **Youngstown minimums** first were raised 100 ft. by CAA because of the new water tower, built by Army Engineers for the $10-million USAF interceptor base at the airport. CAA later notified the city that a waiver had been granted restoring the old 400-ft. minimum ceiling but said the tower would remain.

• **Protests have been made** about minutes of a regional airspace subcommittee meeting concerning the tower, at which George Vest, Chicago CAA regional administrator presided. It is charged by two members of the subcommittee that the minutes do not report correctly the actual recommendation of the committee.

▶**CAA May Reopen Case**—In Washington last week, a representative of the Air Coordinating Committee, fostering agency for airspace subcommittees, told AVIATION WEEK the ACC did not know the regional airspace subcommittee minutes had been challenged. The official said he expected the case would be reopened.

The regional minutes in dispute date back to Sept. 24. They report the following recommendation:

"That the water tank as described in Paragraph 1 be removed or relocated to another site that will not affect the landing minimums at the Youngstown Municipal Airport, provided that the Washington airspace subcommittee or appropriate authorities are not able to issue a waiver on the infraction of the current operational criteria contained in Civil Aeronautics Administration Manual 40."

▶**ATA Challenge**—A letter dated Oct. 27 from Craig F. Timmerman, regional manager of Air Transport Assn., Chicago, to Vest, chairman of the regional subcommittee, says:

"I do not find the recommendations consistent with the action taken by the subcommittee. . . . My recollection of the action of the subcommittee was that we recommended removal or relocation without any reference to the possibility of a waiver. In order to verify my recollection of the action, I checked with Carl Eck of the Air Line Pilots Assn., who confirms my position.

"Accordingly it is requested that the minutes be amended and the Washington Airspace Subcommittee so advised to reflect the action voted on by the members. I do not consider it appropriate that the possibility of a waiver be incorporated in this case."

As far as AVIATION WEEK has been able to ascertain, the Washington Airspace Subcommittee had not learned of the Timmerman request for correction of the minutes until AVIATION WEEK brought it to the attention of CAA.

▶**Case History**—The water tower is located about 2,560 ft. southeast of the northwest end of a new northwest-southeast runway and 1,945 ft. northeast of the center line of the runway. Top of the tank is 146 ft. above ground level and 1,308 ft. above sea level.

Army Engineers did not submit advance notice of construction to the Air Coordinating Committee, because it was assumed there was no conflict with existing airport requirements. The assumption overlooked CAA Manual 40 rules governing minimum approach altitudes.

The structure made it necessary to raise the regular approach minimum for DC-3 and smaller planes from 400 to 500 ft., with a similar increase for all aircraft for straight-in landing approaches.

Air Transport Assn. and Air Line Pilots Assn. filed objections.

Youngstown Department of Public Works advised there had been considerable controversy involving the city, Air Force and Corps of Engineers with regard to the structure and a lease clause that provided:

"The government (federal) shall have the right . . . to construct any facilities . . . as may be deemed necessary, provided such construction and use will not interfere with the use by others of the operating facilities and provided further that such construction will comply with CAA regulations."

▶**Obstruction Cited**—Youngstown Law Department called the tank an obstruc-

tion to aerial navigation and said it would be a detriment to operations of all aircraft flying under instrument conditions. The department asked that the tank be relocated or removed.

"The subcommittee was advised that a reduction in overall height of 12 ft. would allow retention of the previous minimums and would meet all current operational criteria," subcommittee minutes say. "But advice was received that this action was not possible. The subcommittee was cognizant of the fact that the 12-ft. violation was of small consequence. . . ."

▶**Pilot Views**—Pilots flying out of Youngstown Airport, do not consider the 146-ft. tower "of small consequence," a symposium of pilot opinion published by the Youngstown newspaper indicated.

Capt. William Riley, Capital Airlines, expressed concern that the tower would present serious problems in trying to get still lower minimums and satisfactory operating conditions at Youngstown when a new instrument-landing system goes into operation.

Ralph Mathews, pilot of a Sawhill Manufacturing Co. DC-3 executive plane based at the airport, said he always had "considered the Youngstown airport one of the cleanest in the country, and now they've got to let a man-made obstruction ruin that reputation."

Forest Beckett, president of Youngstown Airways, said "it looks like they are willing to lower the civilian safety standards to those of the Air Force."

Lincoln-Mercury Gets New J40 Jet Contract

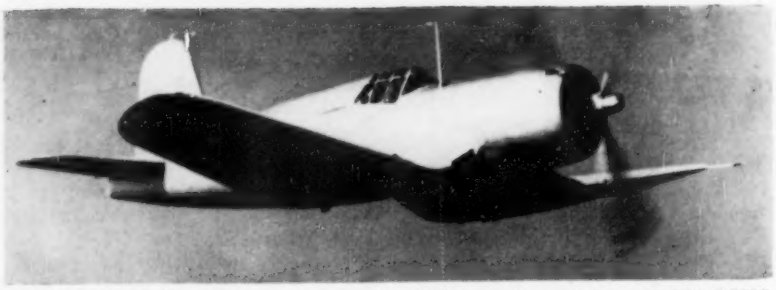
Lincoln-Mercury Division of Ford Motor Co. will build more of the improved version of Westinghouse J40 jet engines for Navy under an additional multi-million-dollar contract just awarded by Defense Department.

The engines will be assembled in a new $50-million Navy plant being built by Ford at Romulus, Mich. The new contract gives Lincoln-Mercury a $154-million jet-engine program. About 25% of the new Lincoln-Mercury auto assembly plant at Wayne, Mich., already is devoted to J40 work.

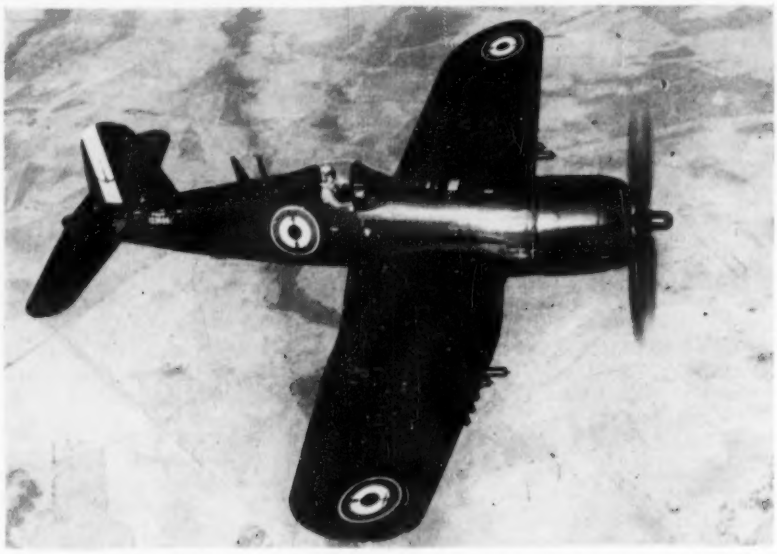
Benson Ford, general manager of Lincoln-Mercury, reports first production J40s are expected to be built this year in the Romulus plant. The contract addition will carry production well into 1955.

The new plant is located on a 160-acre site one and a half miles west of Romulus and four and a half miles south of Wayne on Huron River Drive.

The J40 will power the Navy's newest fighters, the Douglas F4D Skyray and the McDonnell F3H Demon.



FIRST CORSAIR, the XF4U-1, was designed in 1938 around powerful new P&WA R2800.



LAST CORSAIR, F4U-7, for French navy interceptor duty, depicts progress in design.

Chance Vought Builds Last Corsair

When the Navy accepts the last Chance Vought Corsair—No. 12,571—in mid-February, the era of production of piston-engine fighter planes in the U. S. will officially come to a close. Actually, the last of the long Corsair line rolled off the line at Dallas, Tex., Christmas Eve, 1952. Designated F4U-7, it was one of a number for the French navy under the Mutual Defense Assistance Program.

The lines that turned out the last of the Corsairs are being converted to make the new 700-mph.-class F7U-3, Cutlass twin-jet fighter.

Although no more Corsairs are to be built, the familiar inverted gull-wing fighter-bombers are slated to be around for some time.

There are seven different Corsair models which are seeing action in Korea 11 years after the first of the long string went into combat on Guadalcanal Feb. 13, 1942.

Some other fighter types were produced in greater numbers—Republic made more than 15,000 P-47 Thunderbolts and Supermarine turned out 21,767 of the famed Spitfires—but the Corsair holds the record for continuous length of production.

On June 11, 1938, Chance Vought was awarded a contract to build the XF4U-1, winner of a Navy design competition, around the then-new P&WA R2800 Double Wasp. In May 1940 the XF4U-1 flew at 405 mph. A production contract followed, and on June 25, 1942, the first production F4U-1 flew. It had a top speed of 415 mph., a sea level rate of climb of 3,120 fpm., a service ceiling of more than 37,000 ft., and gross combat weight was 12,060 lb.

Brewster Aeronautical Corp. and Goodyear Tire & Rubber Corp. became associated producers during the war; the former made only a limited number but Goodyear turned out 4,014.

During World War II, F4U pilots flew 64,051 action sorties—54,470 from land bases and 9,581 off carriers. They accounted for 2,140 enemy aircraft against a loss of 189 Corsairs.

Some measure of the Corsair's development may be gained by noting that from the first prototype until 1946 there were 981 major engineering changes and 20,000 production changes.

U. S. Disagrees on Air Damage Liability

U. S. delegates to the recent international Rome convention on damages caused by foreign aircraft to persons on the ground are not accepting the findings of the convention, State Department has announced.

Major points not acceptable to U. S.:

- Operator would be held absolutely liable for any damage caused by his aircraft, regardless of fault. U. S. wanted a provision providing for rebuttal.
- U. S. holds limits of liability are too low, wants them substantially higher. Convention limits are scaled from a minimum of $33,000 for a small aircraft to maximum liability for largest operational commercial plane of approximately $800,000. U. S. regards limit of $33,000 for injury or death of one person as out of line, particularly as a limit for injury liability.
- U. S. contends that established liability limits should be removable only in most extreme cases "involving intentional wrongdoing amounting in effect to criminal intent." If acts of servants or agents are involved, unlimited liability to the operator is justified only when the act is expressly authorized by the operator.
- U. S. wants a provision that the country being flown over may satisfy itself on reasonable doubts as to financial responsibility of the insurer of the operator.
- U. S. wants provisions for more flexibility in choice of courts where damage suits may be filed, while preserving limits of liability. The convention adopted a "single forum" jurisdiction, in which actions could be brought only in courts of states where the damage occurred, except in special circumstances and by agreement of parties.

State Department now is planning to invite comments on the convention from interested parties for further guidance of U. S. policy on liability.

Eighteen countries had ratified the convention as of Dec. 1 including: Belgium, Denmark, France, Spain, Israel, Italy, Netherlands, Philippines, Switzerland—all countries with large-scale international airline operations present and pending.

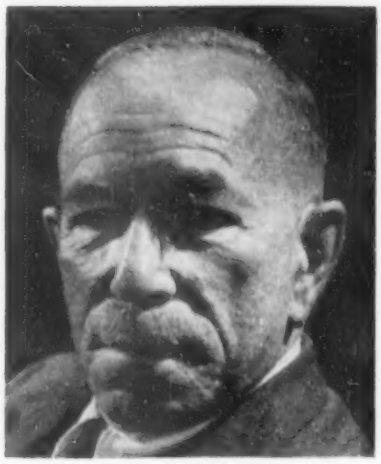
Bolivian Airport Plans

(McGraw-Hill World News)

La Paz—Improvements are planned for the airport system in Bolivia, including building of new fields in the eastern and central section, the Lake Titicaca area and Irupana near La Paz. According to the Bolivian director of commercial aviation, the program is designed to strengthen domestic commercial links. The U.S. Civil Aeronautics Administration is cooperating.

New IAS Honorary Fellows

James H. Kindelberger



Charles C. Walker

Vandenberg Speaks at IAS Dinner

General Hoyt S. Vandenberg, USAF Chief of Staff, will be the guest of honor and principal speaker at the 21st Honors Night Dinner sponsored by the Institute of the Aeronautical Sciences, at the Astor Hotel, New York, tonight (Jan. 26).

The Institute's annual meeting, taking place at the Astor Jan. 26-29 inclusive, will feature technical papers delivered by leading engineers covering all aeronautical research phases.

A series of luncheons will take place Jan. 27, 28 and 29. Principal speakers will be Clifford C. Furnas, director of Cornell Aeronautical Laboratory and chairman of Research and Development Board's Guided Missile Committee; Preston R. Bassett, president of Sperry Gyroscope Co., and W. R. Stovall, of CAA's Medical Division.

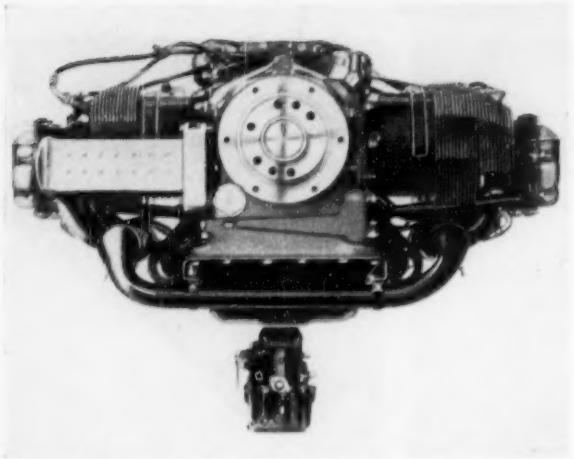
▶ **IAS Fellowships**—The Honors Night Dinner will be the occasion for conferring eight IAS Fellowships and two Honorary Fellowships upon seven Americans and three British engineers. Honorary Fellow is the highest grade of IAS membership and only two persons each year are granted this privilege, one from the U. S.

American Honorary Fellow this year is James H. (Dutch) Kindelberger, chairman of the board and chief executive officer of North American Aviation, Inc., Los Angeles. Foreign Honorary Fellow is Charles C. Walker, chief engineer and a founder-director of de Havilland Aircraft Co., Ltd., England.

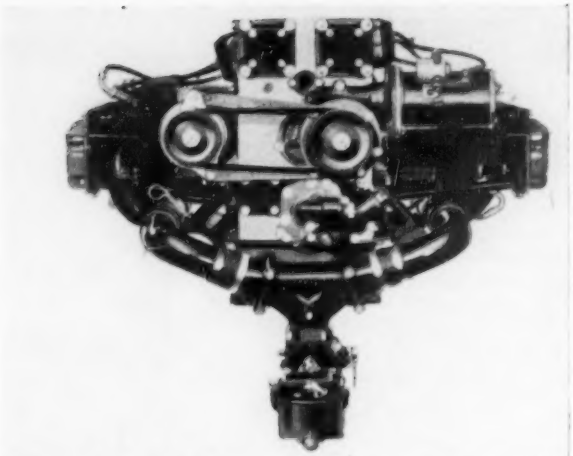
Newly elected IAS Fellows are: Carlton Bioletti, assistant director of NACA's Ames Aeronautical Laboratory; Philip A. Colman, aerodynamic division engineer, Lockheed Aircraft Corp.; G. H. Dowty, chairman and managing director, Dowty Equipment Ltd., and president (1952-1953) of Royal Aeronautical Society, Great Britain; Louis G. Dunn, director of California Institute of Technology's Jet Propulsion Laboratory; Frank W. Fink, chief engineer, Convair, San Diego; Capt. John J. Ide, USNR, NACA consultant; Frank N. Piasecki, chairman of the board of Piasecki Helicopter Corp. and Peter Masefield, of British European Airways.

▶ **Annual Awards**—Another highlight of the Honors Night Dinner will be presentation of the institute's four awards:

- **Dr. Dean R. Chapman** is receiving the Lawrence Sperry Award "for contributions to the basic knowledge of skin friction, base pressure and heat transfer at supersonic speeds." Dr. Chapman is a 30-year-old aeronautical research scientist with NACA's Ames Laboratory.
- **Dr. Vincent J. Shaefer** is being given the Robert M. Losey Award "in recognition of outstanding contributions to the science of meteorology as applied to aeronautics." Dr. Schaefer is a scientist in General Electric Co.'s research laboratory and a rain-making consultant.
- **Lt. Col. John P. Stapp, USAF**, has been selected to receive the John Jefferies Award "for outstanding contributions to the advancement of aeronautics through medical research." Lt. Col. Stapp, who studied for 52 months on human tolerance to abrupt decelerations, is chief of the special projects unit, Biophysics Branch of the Aeromedical Laboratory, Research Division, Wright Air Development Center.
- **John Stack** has been voted to receive the Sylvanus Albert Reed Award for "his leadership in the design, development and practical operation of transonic windtunnels." Stack is assistant director of NACA's Langley Aeronautical Laboratory.



FRONT VIEW of Continental O-470-A. Rectangular perforated unit, left, is integral oil cooler using downdraft as cylinder fins do.



REAR VIEW shows belt-driven generator. Provision is made for two extra drives at rear end of magnet drives on top of engine.

Continental Packs 225 Hp. in New Small Engine

Compactness, higher standards of performance and dependability are cited by Continental Motors Corp. as principal features of its new Model O-470-A engine—a six-cylinder powerplant rated at 225 hp. that is powering Cessna's new four-place Model 180.

Several factors contribute to the compactness of the design:

• **External oil lines** have been eliminated. A new Continental-designed oil cooler is attached integrally to the crankcase, utilizing the down flow of air as cylinder fins do. A full-flow oil filter is mounted in the crankcase at the former location of the screen, which it replaces.

• **Separate accessory case** is eliminated by locating accessory drives within the crankcase and by installing two standard accessory drive pads at the top of the crankcase at rear. These are in addition to normal drives for starter, generator, tachometer, fuel pump and magneto.

• **Propeller governor drive** has no external lines. It is located to left side of the crankcase nose.

• **A small starting motor** designed by Continental is mounted for compactness at right angles to the main engine axis in a rear position. It incorporates overrunning and overloading features, has a torque ratio of 48 to 1 and provides for push-button starting. Continental says torsional vibration and coupling problems frequently found in generator drives are eliminated by a V-belt drive from a pulley at the rear of the crankshaft. The belt drives a 12-volt generator of automotive type, mounted at left rear.

▶ **Small Dimensions**—The new grouping of components and accessories gives the engine an overall minimum height of 19.62 in. and an overall minimum length of 36.03 in., depending on carburetor location. With carburetor at the bottom of the engine, overall height is 25.75 in. Length is 43.31 in. with carburetor at the rear.

A new 5⅛-in. metal flange, designed for use with a constant-speed metal propeller, replaces the wider and bulkier flange required for wood propellers. A constant-speed Hartzell propeller of simplified design can be mounted directly on the crankshaft and operated by governor-control oil through the shaft.

Automatic hydraulic valve lifters and a camshaft of improved design are aimed at simplified service. The lifters permit access to the valve mechanism without removal of the engine from the plane.

▶ **Improved Models**—Various succeeding models of the O-470 series will incorporate such features as fan cooling for helicopter use, supercharging, gearing, and combinations of these features.

A belt-driven external supercharger may be added without affecting the basic powerplant, and the design provides for failure of the supercharger without affecting the powerplant operation. The supercharger may be replaced without removing the engine from the plane.

Continental reports it has records of more than 1,000 hr. of successful operations with belt-driven propellers, at a ratio of 15 hp. per belt.

Aviation Stock Sales Reported to SEC

Sale of 3,200 shares of common stock of Aro Equipment Corp., by John C. Markey, president, leaving a total holding of 82,820 shares, is reported in a recent Securities and Exchange Commission report.

Also reported are the following purchases of common stock by Capital Airlines, Inc.: George R. Hann, director, purchase of 300 shares, making a total holding of 41,172 shares; James W. Austin, officer, purchase of 100 shares, making a total holding of 6,400 shares; Brouwer D. McIntyre, officer, purchase of 200 shares, total holding.

Minneapolis-Honeywell Regulator Co. reports the following sales of common stock by officers and directors: Mark C. Honeywell, director, sale of 10,000 shares, leaving a total holding of 20,560 shares; C. B. Sweatt, officer and director, sale of 200 shares, leaving a total holding of 46,505 shares; Richard P. Brown, officer and director, sale of 225 shares, leaving a total holding of 38,876 shares.

Other transactions reported by aviation officials are:

Alaska Airlines, Inc.: M. Doherty, officer, purchase of 12 common shares and sale of 10 common shares, leaving a total holding of 1,532 shares; Frank LaGrange, director, purchase of 200 common shares, making a total holding of 7,300 shares.

All-American Airways, Inc.: Hamilton O. Hale, director, sale of 500 common shares, leaving a total holding of 1,000 shares.

American Airlines, Inc.: R. E. S. Deichler, officer, exercise of option to purchase 100 common shares, making a total holding of 450 shares; Stanley G. King, officer, exercise of rights to purchase 150 common shares, making a total holding of 600 shares.

Beech Aircraft Corp.: Frank E. Hedrick, officer and director, purchase of 1,000 common shares, making a total of 1,750 shares.

Boeing Airplane Co.: A. F. Logan, officer, purchase of 100 capital shares, making a total holding of 400 shares.

Braniff Airways, Inc.: Eugene C. Eppley, director, purchase of 4,000 common shares by conversion, making a total holding of 5,000 shares.

Colonial Airlines, Inc.: L. Orville Cam-

eron, officer, sale of 200 common shares, leaving a total holding of 300 shares; Francis Hartley, Jr., director, sale of 600 common shares, leaving a total holding of 5,804 shares.

Fairchild Engine & Aircraft Corp.: John H. Towers, director, purchase of 200 common shares, making a total holding of 400 shares.

Flying Tiger Line, Inc.: Wm. E. Bartling, officer, sale of 200 common shares, leaving a total holding of 388 shares; Robert W. Prescott, officer and director, sale of 8,500 common shares, leaving a total holding of 3,228 shares.

McDonnell Aircraft Corp.: Wm. R. Orthwein, Jr., director, purchase of 100 common shares, making a total holding of 5,200 shares.

National Airlines, Inc.: Robert P. Foreman, officer and director, purchase of 119 common shares, making a total holding of 219 shares.

Northrop Aircraft, Inc.: John O'Melveny, director, purchase of 10 common shares, making a total holding of 110 shares; Walter H. Rolapp, director, purchase of 20 common shares, making a total holding of 220 shares.

Republic Aviation Corp.: Robert L. Clarkson, director, receipt through mother's estate of 100 common shares, total holding.

Seaboard & Western Airlines, Inc.: W. P. Neth, officer and director, sale of 25 common shares, leaving a total holding of 426 shares.

Sperry Corp.: John Sanderson, officer and director, purchase of 2,000 common shares, making a total holding of 3,000 shares.

United Air Lines: Gardner Cowles, director, through the Register & Tribune Co., purchase of 3,000 common shares, making a total holding of 8,600 shares.

United Aircraft Products: John M. Meyers, officer and director, purchase of 2,500 common shares, making a total holding of 4,000 shares.

Automatic Safety Belts for Jet Pilots

A new automatic safety belt for bailouts at high speeds and high altitudes is going into production for the Air Force at Stanley Aviation Corp., Buffalo.

Stanley is reported to have a half-million-dollar contract for 5,000 of the automatic devices.

Eventually the belts may become standard equipment on all Air Force high-speed planes.

The belts work in conjunction with explosive ejection seats, which Stanley also manufactures. The new devices are designed to safeguard the pilot in case he should be knocked unconscious during bailout and not be able to release himself from the protective seat structure and open his parachute quickly enough.

▶ **Time Lag**—An explosive charge attached to the belt actuates the seat release, pulls the parachute ripcord a short time after the seat has been ejected.

Time lag is arranged so pilot will clear the plane and presumably slow his initial velocity before the chute is cracked.

Stanley now is making ejection seats for Boeing B-47s and B-52 bombers and for Navy North American FJ-2 Fury carrier jet fighters.

Thomas K. Finletter

Finletter Appeal

- **Keep digging for news, he tells reporters.**
- **Complacency is a danger, retiring Secretary says.**

An appeal to Pentagon reporters to continue to dig out military news, despite "a congenital tendency" of government officials to withhold news on the theory of security, marked the final press conference of Air Force Secretary Thomas K. Finletter in Washington.

Finletter, who is scheduled to be succeeded by Harold E. Talbott in the Eisenhower Administration, told reporters:

"The job of getting the news out to the people is of the highest importance. I think there has been a tendency on the part of people in military establishments to hold back news on the theory of security and also because, I suppose, government officials have a congenital tendency that way anyhow.

"I hope you will continue to worm it out of our successors the way you wormed it out of us and the more you worm—it is a pretty safe rule—the better it will be."

▶ **Complacency**—Finletter said his biggest worry was the fear of complacency in the Air Force and warned that USAF constantly must revise its requirements in view of the basic proposition that we face danger of war at all times.

Among the other highlights of his conference were:

- The idea that the American people cannot afford to create the kind of military establishment that "will make it plainly nonsense to attack us is the greatest piece of nonsense that is currently put before the American people." Finletter said this point of view must be "scratched whenever it is put forward."
- Defense Department has candidly recognized that air power is the dominating key element in our military forces.
- Greater representation of USAF senior officers in top military councils and commands is necessary for the Air Force to fulfill its national leadership responsibilities.
- Recent changes in the field of electronics have affected guided missile development "in a rather sensational way."
- Developments of jet and rocket power in varying forms will revolutionize the types of military aircraft in the future.
- Future relationship of land-based and carrier-based aviation must be settled by higher authority than the three services.
- Intercontinental guided missiles with reasonable accuracy are in prospect "fairly soon."
- New discussion and assignment of the services' military roles and missions is required by the current world situation and development of atomic weapons. Agreements of the Key West and Newport conferences have been outdated by subsequent world events, according to Finletter.

Finletter also reported that USAF's B-36 atomic bomber fleet is now larger than it was last Sept. 1, when a tornado damaged more than 70 of the planes at Carswell AFB, Ft. Worth, Tex. Fifty-one of the damaged B-36s were back in service within 33 days after the tornado struck and Convair has increased B-36 deliveries to give Strategic Air Command more than enough of the 10-engine bombers to make up the deficiency. Finletter said USAF's original estimate of B-36 repair cost had been reduced from $48 million to $23,431,946.

Boeing Tops Industry In Aviation Contracts

Thirty-nine of the top 100 firms awarded prime military contracts from the start of the Korean war through June 30, 1952, were involved in aircraft production, a yearend Munitions Board report reveals.

Boeing Airplane Co., in fourth place on the board's list, led in the aircraft field with $1,847,900,000 in contracts. United Aircraft Corp., Douglas Aircraft Co., Republic Aviation Corp., North American Aviation and Lockheed Aircraft Corp. followed, in that order.

A year ago, the board reported Boeing in seventh position on its list. United Aircraft, with a total of $1,696,700,000,

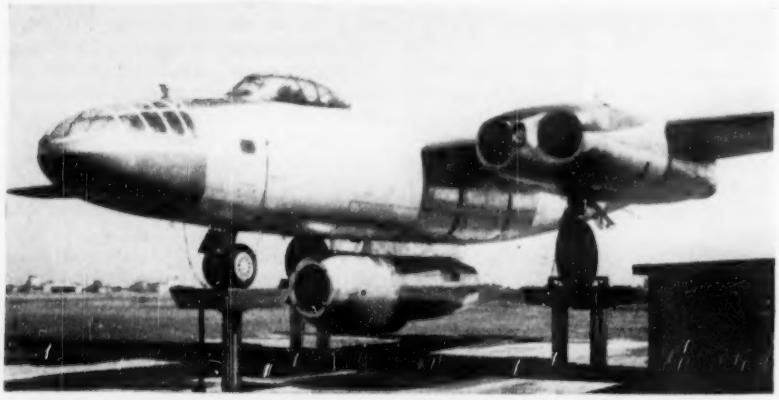
declined from second to fifth place. General Motors Corp., including its Allison-Aeroproducts Division, again led the list of defense manufacturers. GM had a total $5,489,500,000 in contracts. General Electric, with $2,418,300,000 moved to second place from sixth position. Chrysler, with $2,226,300,000 in contracts, shot from eighth place to third.

▶ **Temco Listed**—Sixteen of the 19 companies that received 1% or more of the total are major aircraft production suppliers. Temco Aircraft Corp. is one of 10 companies that were not on the Munitions Board list a year ago.

Canadian Commercial Corp., with $199,410,000 in military contracts primarily for the U. S. aviation industry, technically is among the top 100 firms, the board points out. But the corporation is not listed because it is an agency of the Canadian government.

Here are the 39 firms concerned in aviation production, how they rank among top 100 contractors, amount of their contracts (in millions), and their percentage of the total:

- **General Motors Corp.**, including Aeroproducts Division and Allison Division, (1), $5,489.5, 7.8%.
- **General Electric**, including Aircraft Gas Turbine Division, (2), $2,418.3, 3.5%.
- **Chrysler Corp.**, (3), $2,226.3, 3.2%.
- **Boeing Airplane**, (4), $1,847.9, 2.6%.
- **United Aircraft Corp.**, (5), $1,696.7, 2.4%.
- **Douglas Aircraft Co.**, (6), $1,511.5, 2.2%.
- **Ford Motor Co.**, (7), $1,289.1, 1.8%.
- **Republic Aviation Corp.**, (8), $1,231.8, 1.8%.
- **North American Aviation**, (10), $1,186.1, 1.7%.
- **Lockheed Aircraft Corp.**, (11), $157.3, 1.7%.
- **Curtiss-Wright Corp.**, (13), $990.0, 1.4%.
- **Westinghouse Electric Corp.**, including Aviation Gas Turbine Division, (14), $929.8, 1.3%.
- **Grumman Aircraft Engineering Corp.**, (15), $861.6, 1.2%.
- **Consolidated Vultee Aircraft Corp.**, (16), $820.1, 1.2%.
- **Sperry Corp.**, (18), $712.0, 1.0%.
- **Bendix Aviation Corp.**, (19), $683.0, 1.0%.
- **Northrop Aircraft**, (21), $469.2, 0.7%.
- **Hughes Tool Co.**, including Hughes Aircraft Co., (22), $426.1, 0.6%.
- **Radio Corp. of America**, (23), $412.4, 0.6%.
- **Packard Motor Car Co.**, (24), $407.0, 0.69%.
- **Glenn L. Martin Co.**, (26), $404.5, 0.6%.
- **Avco Manufacturing Corp.**, (28), $385.7, 0.6%.
- **Fairchild Engine & Airplane Corp.**, (32), $310.4, 0.4%.
- **Kaiser-Frazer Corp.**, including Chase Aircraft Co., (33), $303.5, 0.4%.
- **Goodyear Tire & Rubber Co.**, including Goodyear Aircraft Corp., (34), $292.6, 0.4%.
- **McDonnell Aircraft Corp.**, (39), $259.0, 0.4%.
- **Collins Radio Co.**, (40), $253.3, 0.4%.
- **Bell Aircraft Corp.**, (41), $240.8, 0.3%.
- **Continental Motors Corp.**, including Continental Aviation and Engineering Corp., (48), $224.7, 0.3%.
- **Piasecki Helicopter Corp.**, (52), $180.2, 0.3%.
- **Nash-Kelvinator Corp.**, (56), $160.3, 0.2%.
- **Standard Oil Co. (New Jersey)**, (61), $154.8, 0.2%.
- **General Tire & Rubber Co.**, including Aerojet Engineering Corp., (64), $145.8, 0.2%.
- **Hazeltine Corp.**, (70), $119.6, 0.2%.
- **Sylvania Electric Products**, (71), $117.5, 0.2%.
- **Temco Aircraft Corp.**, (87), $92.9, 0.1%.
- **Beech Aircraft Corp.**, (88), $90.6, 0.1%.
- **Gilfillan Brothers**, (94), $81.9, 0.1%.
- **Garrett Corp.**, (97), $79.9, 0.1%.



ALLISON B-45 TESTS J71 JET ENGINE

Allison Division of General Motors Corp., recently completed this modification of a North American B-45C permitting operational flight testing of its powerful J71 turbojet engine. The photos show how the engine can be suspended beneath the plane when airborne (top photo) and retracted into the bomb-bay while on the ground. The engine also may be run on the ground by lifting the plane on its three 50-ton hoists.

ATA Seeks Standard For Shorthaul Copter

The new helicopter committee of the Air Transport Assn. will start work soon on developing standards of design reliability and desirable operating characteristics for a helicopter type to fly the shorter intercity routes.

Most members selected for the initial committee are engineering, maintenance and operations experts. This group will submit an interim report to ATA members and then invite representatives of the traffic, scheduling and ground-handling phases of the airline industry to join the committee. ATA also announces that the committee will ask recommendations and analyses from airline pilots who hold active helicopter licenses.

Temporary chairman of the committee is Charles Froesch, vice president, engineering for Eastern Air Lines. Other members: J. J. Casey, American Airlines director of standards and procedures; H. J. Reid, Capital Airlines manager of flight operations; David E. Postle, Mohawk Airlines director of research; A. A. Lane, Trans World Airlines chief engineer; Graham Aldrich, Air Transport Assn. economic consultant, and Donald B. Talmage, ATA engineer who will be secretary of the copter committee.

Airline Fatalities Low in Venezuela

(McGraw-Hill World News)

Caracas—Despite the heavy dependence on air travel within Venezuela, the country's three airlines have suffered only 49 fatalities during the past five years.

Aeropostal experienced one fatality in the 1948-1952 period; TACA flew from 1948 to 1951 without a fatality then accidents last year took a toll of nine lives.

The greatest losses have been suffered by Avensa, which had 39 fatalities, 31 of them in 1950.

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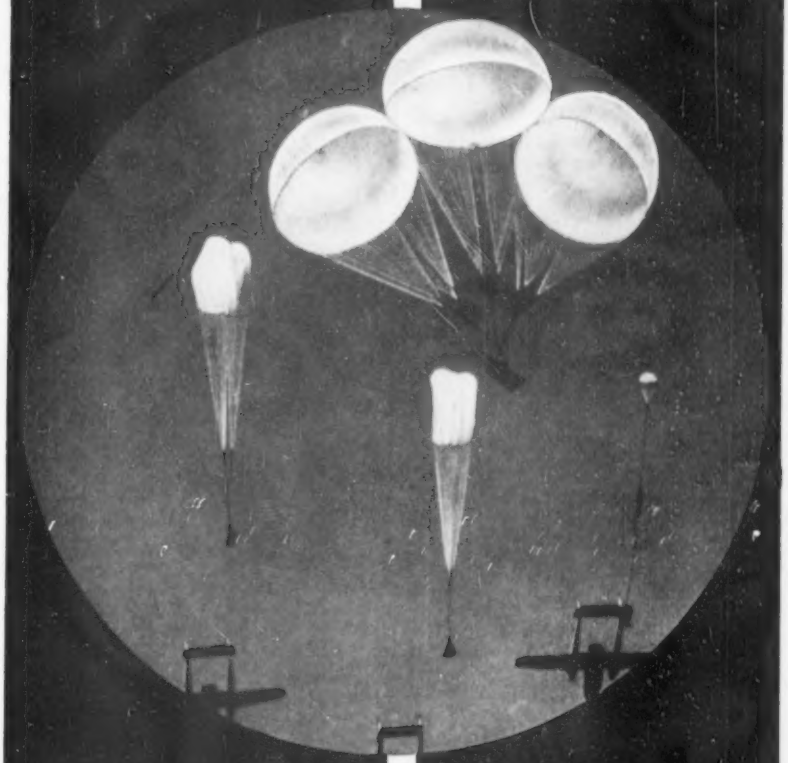

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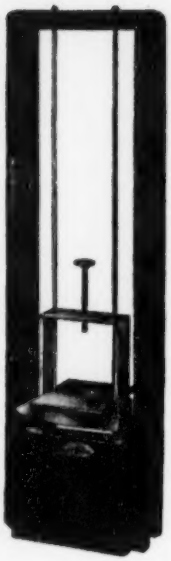

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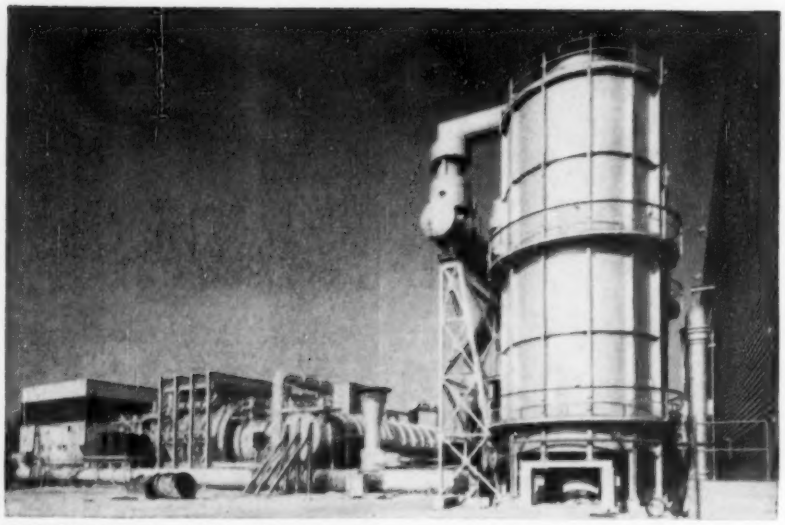
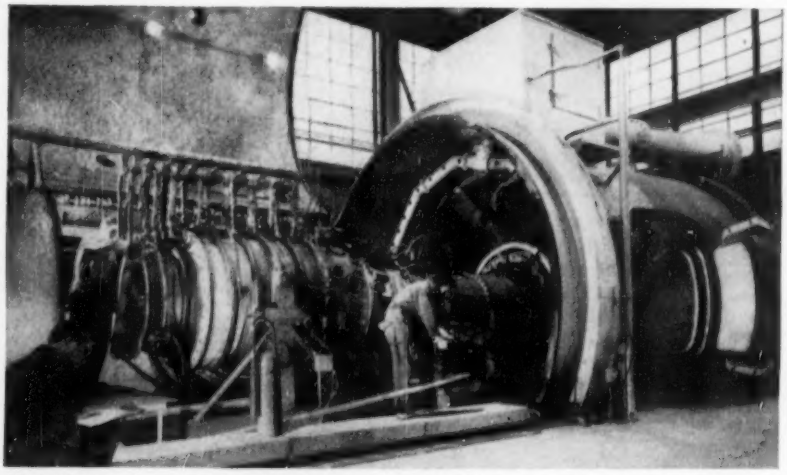


EXTERIOR view of $14 million propulsion systems test facility of Lewis Laboratory.



INTERIOR of one of two altitude test chambers which can take complete jet engines.

NACA Opens Lab for Giant Jets

National Advisory Committee for Aeronautics has completed and put into operation a new $14-million jet engine testing facility at its Lewis Propulsion Laboratory, Cleveland.

The new propulsion systems laboratory provides two test cells capable of accommodating the largest jet engines now in prospect under conditions simulating supersonic speeds and altitudes above 60,000 feet. Construction was begun in 1949, and initial test operations started late last year.

A similar type of jet engine test facility is one of the principal features of the controversial USAF Arnold Engineering Development Center operated by Aro, Inc., at Tullahoma, Tenn. The AEDC engine test facility was scheduled for completion during 1952 but has been postponed at least another year.

Three additional altitude test cells also are being added at the Pratt & Whitney-financed Andrew Willgoos Turbine Laboratory at East Hartford, Conn.

► **Improvements**—The new NACA facility features improved altitude exhaust vacuum and other process systems necessary to simulate speed and altitude conditions in the test cells and to provide a total air movement of 825,000 cubic feet per minute.

NACA also has devised a system whereby the exhausters of the new facility, as well as those of the other jet engine test rigs, can be connected by cross-piping to make available the total capacity for any specific test installation. The refrigeration systems and combustion air suppliers also have been cross-linked for similar use.

NACA revealed the new engine test

J-M Clipper Seals fly with the Sikorsky HO5S helicopter...

Clipper Seal being installed in the intermediate gear box of the Sikorsky HO5S helicopter to seal oil in, keep abrasives out.

Photograph and cross section of Type LPD Clipper Seal. This is just one of numerous styles available to solve tough sealing problems.

...seal oil in, keep abrasives out, at critical locations

To retain the lubricants vital to its complex rotor and gear systems . . . and to protect bearings against the infiltration of abrasives . . . the new Sikorsky HO5S helicopter depends on these positive sealing qualities of Johns-Manville Clipper Seals.

Clipper Seals are flexible—molded of special compounds, they have a tough, dense heel and a soft flexible lip concentrically molded into one piece.

Clipper Seals reduce friction—A specially designed garter spring holds the lip in tight but firm contact with the shaft. Thus a positive seal is always maintained but shaft wear is reduced and overheating is prevented.

Clipper Seals are corrosion-resistant—The molded body is entirely non-metallic, is therefore unaffected by electrolysis and most forms of corrosion. And the garter spring is available in various corrosion-resistant metals.

Clipper Seals are versatile—They can be furnished in flange sections of varying widths to fit practically any cavity. Various lip designs are available . . . and various lip compounds provide the proper hardness for temperatures from −65F to +450F.

To find out more about Clipper Seals and their application to your particular sealing problems, write Johns-Manville, Box 60, N. Y. 16, N. Y. In Canada, 199 Bay St., Toronto 1, Ontario.

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facility in its 38th annual report to Congress in which Dr. Jerome C. Hunsaker, chairman, warned:

"Recent failures of high-speed airplanes in flight indicate that we do not fully understand all of the problems of high-speed flight. Innovations in design should be supported by more adequate research."

NACA has asked a $77.6 million appropriation for fiscal 1954 to support its research program and estimates it will spend $95 million during the same year for research activities and construction of research facilities.

► **Supersonic Flutter**—Dr. Hunsaker confirmed that USAF pilots repeatedly have flown faster than sound in F-86 Sabres over Korea in combat with Russian MiG-15 fighters and predicted that supersonic combat aircraft now are assured but their successful development requires much further research.

One of the principle obstacles to designing practical supersonic combat aircraft listed by NACA is the problem of wing flutter.

NACA notes that the performance gains of modern jet combat aircraft have been achieved at the cost of a greater susceptibility to flutter.

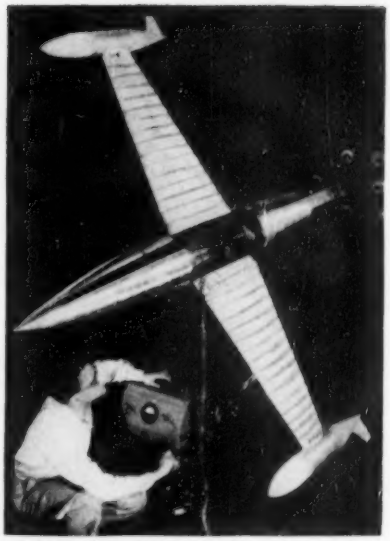
"The flutter problem has become more complex and difficult in the post-war period as designers seek to use extremely thin wings on airplanes to be flown ever faster, ever higher," NACA says. "Once it was necessary to consider only the more simple vibrational characteristics. Now it is found that unless flutter analyses take into account as many as possible of the characteristics the results will be seriously in error.

"At the higher altitudes the ratio of air density to airplane density becomes so low that different patterns of flutter vibrations and different flutter speeds (lowest speed at which flutter occurs) may occur as the airplane dives or climbs from one altitude to another. Variable structure stiffness and the distortions resulting from aero-dynamic heating add further to the difficulty of the problem.

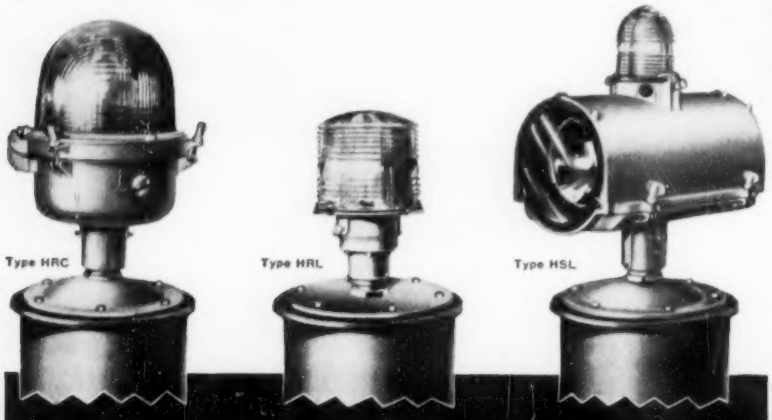
"In fact flutter has become so complex that scientists have been frustrated in attempts to even formulate it theoretically, much less suggest theoretical solutions. Much research is being devoted to theoretical attacks on the problem, but in the meantime the most effective solutions are resulting from experimentation."

Two types of flutter experimentation are being carried on by NACA. One involves investigation of air loads on a vibrating wing. The other is aimed at measurement of flutter speeds of actual aircraft wings.

To advance this research NACA has developed special facilities, including pressure cells designed to yield a quick response for more accurate determination of air loads that cause wing flutter; high-speed computing machines to extend the number of mathematical calculations that can be made on vibration characteristics of any given wing, and modification of a large windtunnel for 24-hr.-a-day flutter testing of dynamic aircraft models.



FLUTTER TEST rig of dynamic model of wing with tiptanks is adjusted by engineer.



CROUSE-HINDS
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of high intensity airport runway lights

The Crouse-Hinds Company offers all three types of high intensity fixtures to meet the three CAA Specifications (L-818, L-819 and L-820). All three fixtures (types HRC, HRL and HSL) are approved by CAA.

Type HRC utilizes a double prismatic lens system on a cast aluminum base, with a 500-watt, 115-volt lamp mounted on a movable socket. The main beams may be "toed in" or "toed out" by remote control from the tower to provide the best setting for particular visibility conditions. The candlepower is the highest of the three types. In bad weather the pilot sees more lights and sees them sooner with this system.

Type HRL is constructed with an optical prismatic Pyrex globe mounted on a 3-piece cast aluminum fixture assembly. Each fixture uses a 200-watt lamp and is provided with a series-to-series insulating transformer installed underground in the base housing.

This system has the lowest installation cost. Its use is often justified for non-instrument runways, as well as instrument runways.

Type HSL has a cast aluminum housing with two 95-watt sealed beam high intensity lamps inside and a 30-watt medium intensity light on top. Three insulating transformers are installed underground in the base. Each of the three lamps may be switched separately from the tower.

This system is economical to operate, since only 95 watts is used for the high intensity beam, and a 30-watt light is used in good weather. This fixture provides a main beam in only one direction, without the background haze resulting from the "back beam". After relamping, the sealed beam optical system is back to 100% initial efficiency.

All three fixtures provide the basic high intensity candlepower required and the three types have many construction features in common such as: cast aluminum housing, Pyrex glassware, disconnecting cable connector, same breakable coupling and standard steel base with base plate. All three units provide the necessary top light and side light needed for planes not on the approach path and all use a 5-stage brightness control.

Write for Bulletin 358-F. It contains detailed features and an impartial comparison of the relative advantages of the three systems with estimated installation costs of each.

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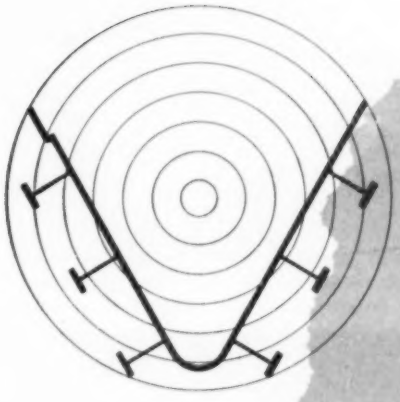

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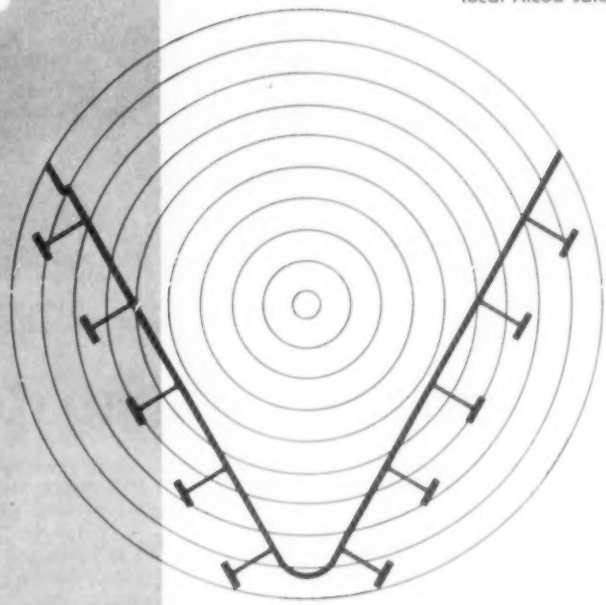

Alcoa Aluminum

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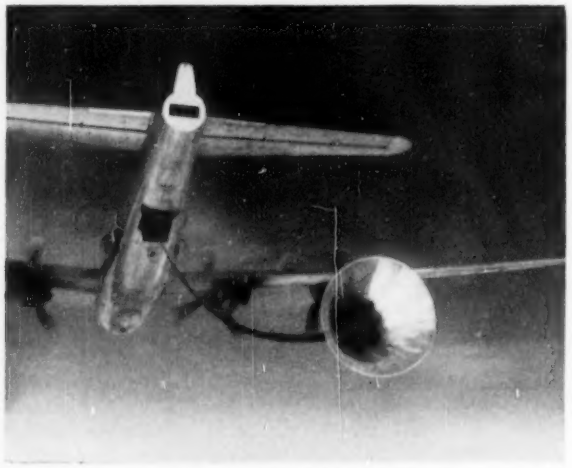
SAVAGE MOTHER feeds Panther. New AJs will be dual-purpose bomber-tanker.

1-FOR-2 scheme of multiple refueling of jets is one reason Navy prefers P&D system to Flying Boom setup.

FLYING BOOM flight refueling equipment made by Boeing is installed in AF bombers.



BETTER 'OLE is provided by P&D setup seems to be winning out in U. S. over Flying Boom.

Probe-and-Drogue Inflight Refueling:

By George L. Christian

Danbury, Conn.—The British-conceived probe-and-drogue system for refueling aircraft in flight is rapidly gaining in this country.

Navy has already announced that its new jet fighters will be probe-equipped. And North American AJ Savages coming off the line will be fitted to accept a bomb bay tank-drogue package unit which can be installed as rapidly as the plane can be bombed up. The craft will thus serve a dual purpose—tankers or bombers.

Air Force, which has led the way in use of the P&D system in this country, has a number of Boeing B-29s already equipped with it. AF has fitted a B-47 with the A-12 drogue unit and has conducted tests refueling B-47s. There is speculation that a future role for the giant Convair B-36 may be that of refueling tanker.

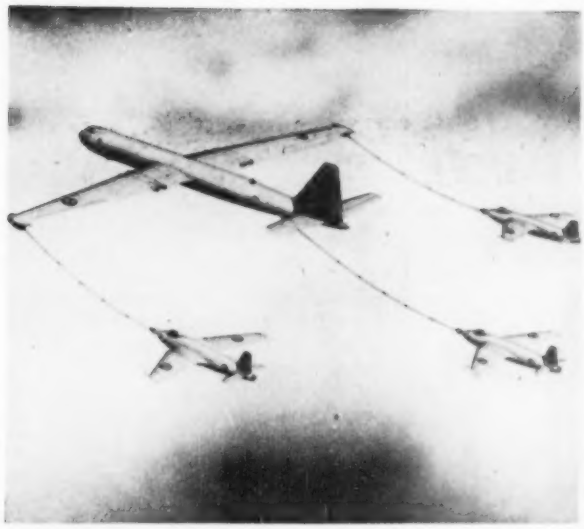
A small plant, Flight Refueling, Inc., is currently supplying A-12 systems in service test quantities to both the USAF and BuAer. Complete details of the operations of this method are given later in this story.

▶ **Refueled Jets**—First announced use of the P&D system by USAF was in 1950, when Colonel David Schilling, flying a Republic F-84, made the first successful nonstop flight in a fighter across the North Atlantic using air-to-air refueling.

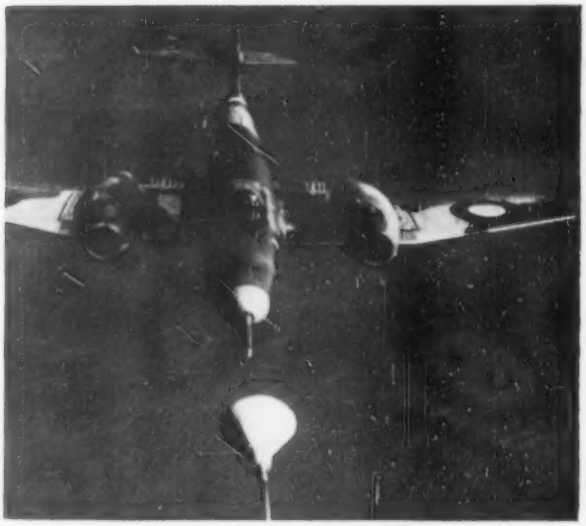
In 1951, Col. Harry Dorris made the longest known combat strike, flying a probe-equipped F-80. Taking off from a Japanese base, he made five strikes at widely separated Communist targets and returned to Japan. He made seven contacts with a B-29 tanker, all in complete radio silence, and remained aloft over half a day—14:15 hr.

Even more recently, Air Force revealed the dramatic episode of two F-84s flying cover for two other F-84 pilots who ditched their battle-damaged craft in Korean waters. Using the P&D system, pilots of the cover planes were able to stay with the downed airmen until they were rescued.

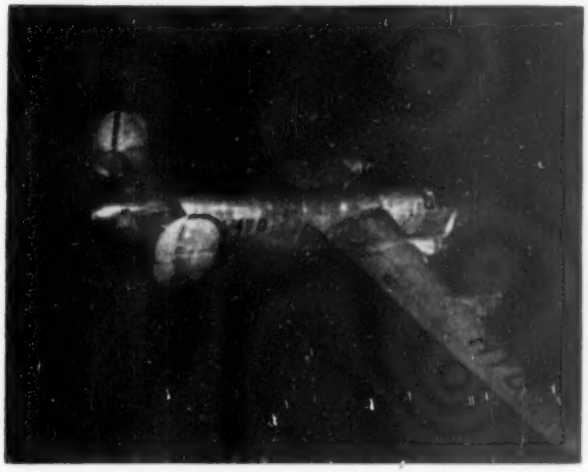
USAF aircraft known to have been equipped experimentally with the receiver plane probe are: F-80, F-84, F-86,



THIRSTY THREE are fueled from single P&D tanker in this British conception.



METEOR about to make refueling contact in 12-hr. record endurance flight, Aug. 7, 1949, over England.



NIGHT FEEDING of BOAC Liberator on nonstop Montreal-London flight.

EARLY BIRD in air refueling—Question Mark, flown by Spaatz and Eaker to 1929 150-hr. record.

How It Works and How It Developed

B-29 and B-47. USAF tanker craft are: KC-97, B-29 and reportedly one B-47. Ironically, although most P&D tankers are Boeing aircraft, Boeing makes the only competitive inflight refueling equipment, the Flying Boom.

▶ **Navy Interest**—BuAer is obviously interested in inflight refueling. Of the two systems, Navy apparently prefers the probe and drogue because it allows for multiple refueling—at least three planes can refuel simultaneously from one tanker. And system is compact and light enough to fit into carrier-borne Savages.

A new use suggests itself for naval inflight refueling: If fuel-low fighters, returning from a strike, find it impossible to land aboard their ship for some reason (such as bomb-damaged flight deck), planes could plug in to a tanker, refuel and circle until damage is repaired.

This could eliminate need for planes to land aboard other carriers in task force, or if the carrier were alone, save them from ditching.

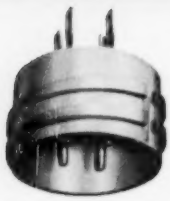
Probe-equipped Navy planes include the Grumman F9F and the McDonnell F2H-3 all-weather version of the Banshee. North American AJ-1s and -2s are being equipped as tankers, and the Navy has released an artist's conception of Convair's turboprop flying boat, the R3Y-1, refueling two fighters at once from drogues located in wingtips.

▶ **Good Points**—Some 2,000 refueling contacts have been made in the Korean theater, using the P&D system, Flight Refueling reports. From this experience have emerged several significant advantages of air-to-air refueling. Some are common to both P&D and Flying Boom systems; others are peculiar to the former only.

Flight Refueling listed these points as exclusive advantages of its method:

• **Multiple refueling.** Probably the most attractive feature of the P&D system is its ability to refuel more than one receiver simultaneously from one tanker. Reduced "queuing up" time is clearly desirable for thirsty jets, the company points out. The Air Force has been experimenting for over one year with multiple inflight refueling. B-29 tanker and F-86 receivers have par-

CANNON PLUGS *for hermetic sealed applications*



KH

RKH

HERMETIC SEALED Type RKH Plugs and KH Receptacles mate with their corresponding Cannon RK and K standard fittings. The basic construction of fused vitreous insulation around the contacts is same as GS type. Shell materials and finish are likewise similar. Various types of flange or hex-bulkhead styles may be made to order.

Refer to KH-1 Section in K Bulletin.

SUB-MINIATURE receptacles of the new Cannon "U" Series are used on miniature switches, relays, transformers, amplifiers, and other sealed components, requiring a true hermetic seal or a connector of sub-miniature size with performance superiority.

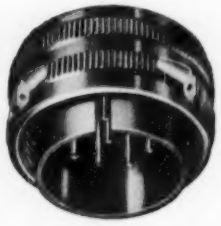
"U" plugs have a steel shell and "SILCAN*" insulator, cable relief and moisture resistant sleeve.

Bayonet-type locking means prevents vibration failure. Rated 1700v. d.c.; 5a. Available in 3, 6, and 12 contact arrangements with one plug style and two receptacles.

**Cannon Electric's special silicone resilient material.*

Refer to U-2 Bulletin

GS02



GS06

GS Types mate with standard AN(MIL) types. These highly successful hermetically sealed plugs (GS06) and receptacles (GS02) pioneered this field and are top quality fittings. Fused vitreous insulation provides a true hermetic seal for relays, position indicators, etc. Shells are steel, finished in cadmium plate and bleached Iridite; coupling nut on plug is natural finish Dural. Eyelet or solder pot terminals.

Built to resist thermal shock, −300°F. to +600°F., surpassing MIL Spec. GS02 Types will withstand operation temperatures 400°F. to 600°F., and pressures as high as 200 to 900 psi; specials to 7500 psi. GS Types approximate AN voltage and current ratings. Wide range of AN layouts available.

See GS-3 section in AN-8 Bulletin for details.

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ticipated in these Air Force tests.

• **Light weight.** The probe and drogue units weigh considerably less than boom system. The probe adds about 25 lb. to the receiver, much less than the boom receiving equipment. On one current fighter, the entire added weight of the probe, including structural modifications, piping etc., adds up to slightly more than 100 lb. compared with nearly 300 lb. for the boom set-up. The A-12 hose reel assembly and components weigh in at roughly 600 lb., less than half the weight of boom tanker components.

• **Small size.** Probe is small enough to be made retractable into a fighter if aerodynamicists feel that its presence would adversely effect the receiver's flying characteristics. But Flight Refueling spokesmen say that dozens of pilots who have flown probe-equipped planes claim that the probe has no noticeable effect on the crafts' performance. And the drogue unit is compact enough to fit into bomb bay, tail, or wingtip or underwing streamlined housings.

• **Flexibility.** Since the drogue unit may be easily installed or removed, the plane can serve as either a bomber or tanker.

• **Handling ease.** Receiver pilots say that making contact with the drogue is considerably easier and requires less coordination than landing the aircraft. Contacts can be made and refueling accomplished without too much difficulty even in moderately rough air. This is made possible by the hose's flexibility.

• **Completely automatic.** The receiver pilot is master of his own actions when using the probe-and-drogue system. He can make contact when he chooses and break when he chooses. Actual refueling process is completely automatic. It is unnecessary to carry along a third man, trained to do a specialized job, and his weight in the tanker is saved.

► **Air-to-Air Advantages**—Regardless of which system is used, there are many advantages to air-to-air refueling. Among these:

• **Light takeoffs.** Far more weight may be devoted to payload—more bombs, rockets, etc. Plane takes off with light fuel load, takes on additional fuel at altitude. A current model jet fighter requires 40% more runway when taking off with full tiptanks than with tiptanks empty. Rato takeoffs could be eliminated, or at least reduced, if takeoff weight is lowered.

• **Fast climb.** With small fuel load, a jet can climb much faster and more economically to refueling or cruising altitudes.

• **Tactical flexibility.** Normally, a jet striking force flying from point A to attack point B might follow a fairly straight line to conserve fuel. Consequently the enemy would dispose much of his defenses, anti-aircraft and inter-

sps aircraft fasteners

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INFORMATION ABOUT FLEXLOC ON REQUEST. ADDRESS DEPARTMENT 51,

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Pumping "reach" into jet bombers

A Boeing B-47 Stratojet streaks into the rendezvous area where its KC-97 Tanker teammate is waiting. A quick inflight contact is made – fuel tanks are replenished from the tanker, and the bomber continues on its way.

This aerial refueling technique, and the necessary equipment, has been developed by Boeing working closely with the Air Force. It is equally effective with bombers or fighters.

Jets fly faster, and higher, than conventionally powered aircraft. They must – in order to accomplish their missions against improved defense techniques. But in doing so they consume enormous quantities of fuel, thus limiting their range. Aerial refueling adds range – extends the distance over which the jet can reach its target.

Aerial refueling has become so routine in the Air Force that Boeing tankers have made literally thousands of refueling contacts. One refueling squadron alone has already transferred more than a million gallons of fuel aloft.

Boeing KC-97 Tankers are being delivered to the Air Force in substantial quantities. Organized into squadrons, they are operating as integral parts of combat bomber wings. These versatile Boeings are able to perform many other services in addition to those of flying tankers. For each one, in a matter of hours, is convertible into a troop transport, a swift cargo carrier, or a flying hospital unique for its speed, capacity and pressurized cabins.

The KC-97 is a soundly engineered, ruggedly built, high-performance airplane. It is distinguished by the same integrity of research and manufacture, the same imaginative engineering, that have characterized Boeing airplanes throughout its 36-year history.

For the Air Force, Boeing is building the
B-47 Stratojet, B-50 Superfortress, C-97 Stratofreighter, KC-97 Tanker and the B-52 Stratofortress;
and for the world's leading airlines, Boeing has built fleets of twin-deck Stratocruisers.

BOEING

ceptors along that straight line. With tankers, the striking force could make sweeping detours around either flank, possibly by-passing the enemy's defenses and increasing the element of surprise.

• **Commercial advantage.** The chief engineer of a major U. S. airline stated that economics rather than safety would be the deterrent to commercial inflight refueling. (Historical records indicate that the only fatal accident attributable to inflight refueling occurred at an air carnival in 1923. The receiver plane's propeller chewed into the hose, causing the fatality.)

The airline engineer added that he saw a great future for the system for long-range, over-water flights with jet aircraft. The considerable reduction in takeoff weight and consequent increase in payload (provided the aircraft is not space limited as some are today) could make the system very attractive. And the added safety factor of being able to fuel up for almost any alternate should the destination "sock in" is another desirable consideration.

At the moment, he said, there are not enough people in the United States who want to fly nonstop from coast to coast to warrant many such flights. Since coast-to-coast flights make one stop anyhow to pick up passengers, refueling is no problem.

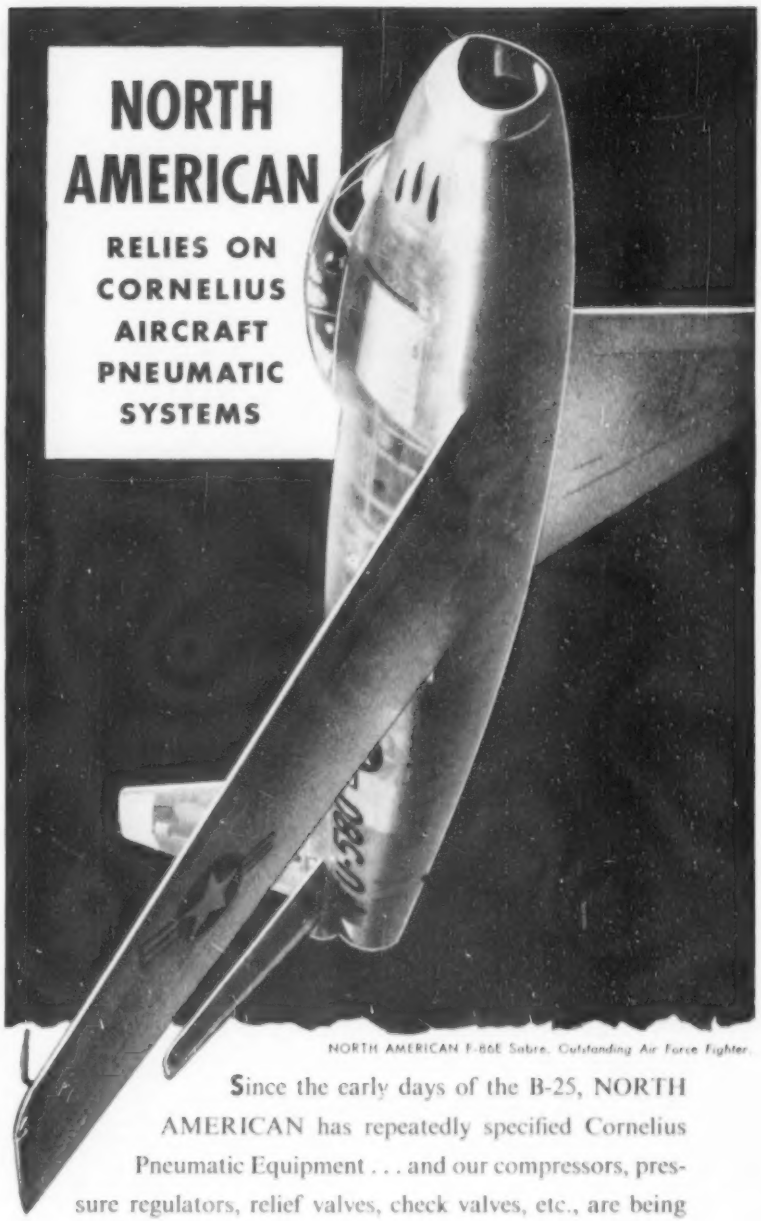
However, when jets make a 4½-to-six-hour nonstop crossing feasible, such service may generate enough nonstop transcontinental traffic to warrant several flights a day by the airlines serving both coasts. Then, he feels, inflight refueling may well be a paying proposition. It has even been suggested that oil companies sell fuel in the air in much the same manner that they now do on the ground.

► **Looped-Hose System**—The current probe-and-drogue system is an outgrowth of the Looped-Hose system in which Sir Alan Cobham, now managing director of British Flight Refuelling, Ltd., became interested in 1932. The system, as used by the U. S., worked this way:

Receiver plane let out a weighted line. The tanker trailing a steel cable with a grapnel attached, flew above and behind the receiver, crossing over the receiver's tail. The tanker's steel line tangled with the receiver's.

Operator aboard the tanker pulled in the lines and attached refueling hose to receiver's cable—hard, cold and windy work at best. Receiver operator pulled hose aboard. Hose was locked to receptacle and fuel passed. When refueling was completed, operation was reversed to get cables back aboard.

Numerous trans-Atlantic flights were operated with this system by the British in 1939 using Short, Class "C", flying boats, and after the war with B-24



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Liberators. Scheduled mail service was flown between Southampton and Montreal. Termed successful, the flights came to an end with the onset of World War II. (The British system differed from the American version in one respect: The tanker fired a harpoon-like device which carried its line across the receiver's, instead of the tanker plane crossing over the receiver's tail as in the American version.)

▶**Probe & Drogue**—The Looped-Hose system was good for its day. It was used in 1949 to refuel Lucky Lady II, the USAF B-50 which circled the globe nonstop in 94 hr.

But it was impractical for fighters, and the rapid development of jet fighters in the postwar era hurried the development of a new system feasible for single-seater planes.

This was the P&D system. Its success was first demonstrated in 1949 when a Gloster Meteor remained airborne for 12 hours. Ten refueling contacts were made.

▶**How P&D Works**—Robert Schoonmaker, vice president of Flight Refueling, Inc., of Danbury, Conn., gave this description of how the probe-and-drogue system works:

A remotely located operator, usually the flight engineer if the tanker has one, has a small panel from which he controls the drogue. The panel mounts a footage indicator, a thermometer and several switches, including motor and hose switches.

First operation is to move the motor switch from neutral position to "on." This starts the system's electric motor running at a constant speed and warms standard-type fluid coupling drive to desired temperature range of 46–100C. A thermostat automatically bypasses the coupling's fluid around an oil cooler until the desired temperature is reached. Then the motor is turned off.

When fueling is about to start, the hose switch is moved from neutral to out. If the drogue unit is retractable, these events automatically take place in sequence: doors in the aircraft's belly (for instance) open; the unit is lowered into the airstream and locked in the extended position; an electrically operated hydraulic brake acting on the hose drum is released and air drag on the drogue pulls it astern of the aircraft; a governor keeps unreeling rate constant by intermittently applying the brake; footage indicator keeps the operator informed of unreeling progress.

When hose reaches proper trail distance, usually about 65 ft., a nut on a lead screw turning with the drum actuates a microswitch. This applies the brake to prevent further unreeling and engages a pawl on a ratchet. The pawl also prevents the reel from unwinding, but will ratchet when reel winds in. A time delay relay releases

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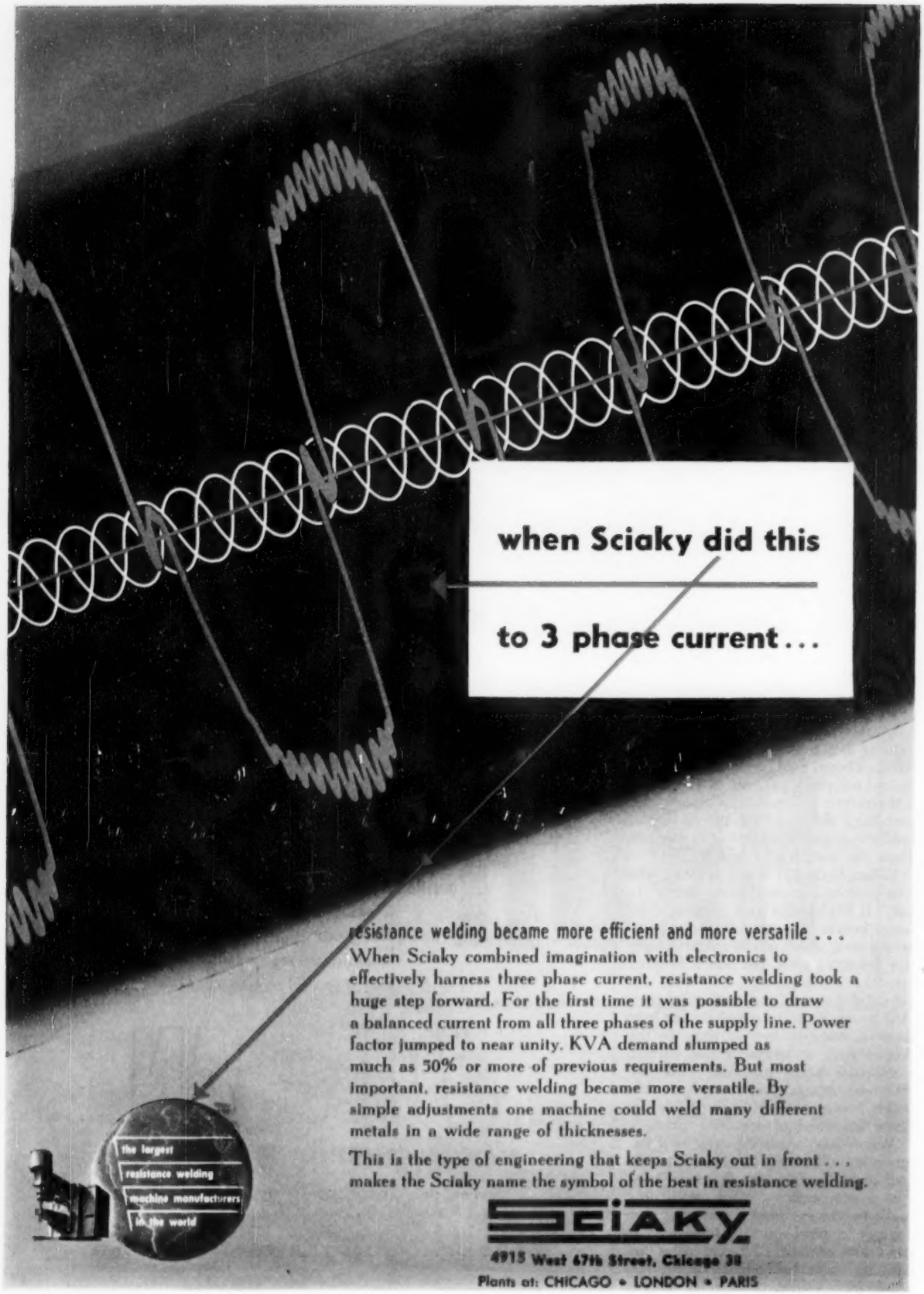

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the brake soon after the pawl becomes engaged.

When operator sees that the hose is properly unreeled, he switches the motor on again and his work is finished until re-reeling is in order.

The motor turns at constant speed in the direction to reel in the hose. A two-speed gear box in the drive system prevents re-reeling, however, because the gear box is in "high" and the motor cannot develop sufficient torque to overcome the considerable air drag on the drogue and the lesser drag on the hose itself.

Turning on the motor also lights an amber light close to the drogue unit which tells the receiver pilot that he may start refueling. He will be in complete command of the whole operation which takes place automatically. It is assumed that the tanker pilot flies straight and level.

As the receiver approaches the drogue, the hose is full of fuel, but pressure from pumps is zero.

The pilot flies the probe into the drogue at a differential overtake speed of about 5 mph. Contact mechanically opens a valve in the drogue and another in the probe. Spring-loaded rollers in the drogue ride up a ramp on the probe, then seat themselves in a deep groove which completely circles the probe to lock the two units together. Engaging force is about 20-30 lb.

Transfer of the drogue's air drag from tanker to receiver usually slows the latter enough to require an increase in power setting. The slowing effect is desirable because it helps reduce the possibility of the receiver ramming the tanker.

As the receiver advances on the tanker, the hose automatically reels in because, with drogue drag removed, the motor now has sufficient torque to take up the hose. A slack hose would be undesirable because of tendency to whip.

The receiver advances on the tanker until pilot feels himself in a comfortable refueling position.

When the first five feet of hose have been rewound, the lead screw nut actuates another microswitch, and the following sequence occurs:

A small fuel vent valve in the A-12 unit closes. (It had been open to allow the fuel in the drogue system to "breathe" and take care of any thermal expansion or contraction.) A large fuel valve opens, allowing pumps to force fuel into the receiver. The amber light goes out. A green light goes on to show the receiver pilot that fuel is passing. And the reel pawl is released to allow the hose to unwind as well as rewind.

Fueling takes place until the receiver's tanks are full or the receiver pilot decides to discontinue operation. When

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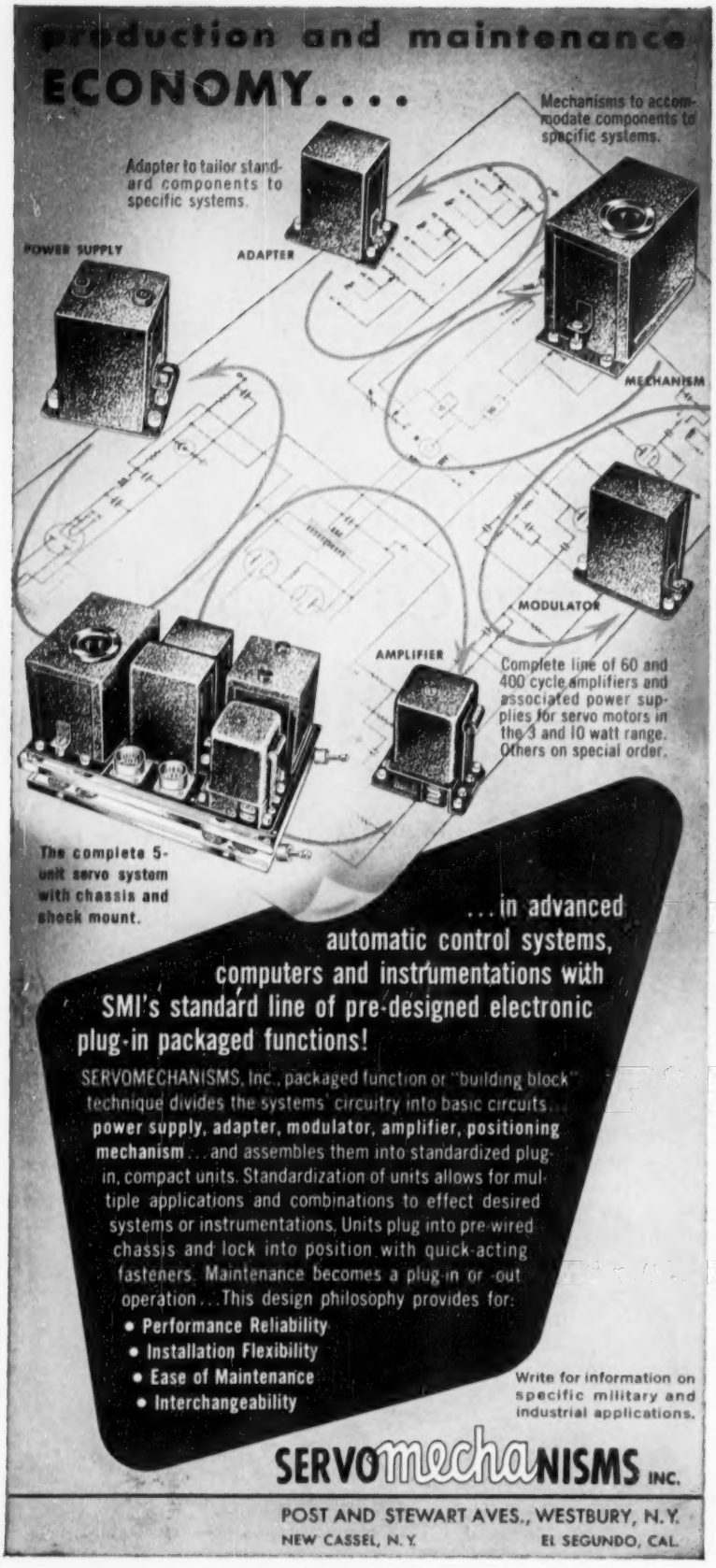
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tanks are full, tank-filling valves (there are usually two in series, in case one fails) shut off further fuel flow to the receiver. (These valves at present tend to act too fast, creating high surge pressures in the system, AVIATION WEEK was told.) When receiver pilot sees that fueling has stopped, by watching fuel gages, signal light, etc., he reduces throttle and starts to back off.

At the 60-ft. mark, vent valve opens, fuel valve closes, green light goes out, amber light on. At the 65-ft. point, the brakes are applied, pawl engaged and brake released. Probe disengages from the drogue, requiring a pull of about 800 lb. Fuel spillage at break-away is said to be negligible and immediately dissipated.

Hose valve spring in the drogue is twice as strong as the spring in the probe. This is to assure that the drogue fuel valve is the last to open and the first to close when the probe and drogue mate.

Flight Refueling gave these times as average for the P&D system: closing—45 seconds; break-away, including peel-off—20 seconds. Refueling time is dependent on amount transferred.

► **Hose In**—This is how the drogue unit is stowed when all refueling is completed:

Operator shuts the electric motor by moving its switch to "off." Hose switch goes to "in." This turns off amber light and puts gears in low position. Motor is turned on and reels in the hose and drogue (its torque has been increased 2½ times in the new gear position).

When hose is fully wound, brake is applied. This action initiates unlocking the drogue unit. It retracts and the doors close automatically, an electrical interlock assuring proper sequence of events, as in all other automatic operations of the system. When unit is stowed, both motor and hose switches are returned to neutral and the operation is complete.

Two emergency means of stopping the hose are provided if the micro-switch operation of the brake fails. A mechanical spring-loaded trigger is provided to work on the brake, and if this fails, a collar around the hose is stopped by the hose exit fairlead before hose is entirely played out.

► **Night Use**—Night operation of the P&D system has proved as simple as daytime use, says Col. Schilling. Exterior lights on the drogue dimly illuminate the funnel's interior through holes in the drogue's cone. A receiver spotlight shines on the probe.

Schoonmaker says no serious troubles have been experienced with the probe-and-drogue system, although hoses have broken under extreme overload conditions and the 32-in. diameter drogue has put minor dents in tanker aircraft.

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Remote VHFs to Speed N. Y. Traffic

- **ARTC now can control planes 175 mi. away.**
- **This should eliminate many flight delays.**

By Philip Klass

Three new remotely located VHF stations, the first of their kind, have extended the voice and the direct control of the New York Air Route Traffic Control Center by 75 miles along the important N. Y.–Chicago and N. Y.–Washington airways.

The new "perimeter control" is expected to reduce greatly, if not eliminate, flight cancelations and en route delays which have been so characteristic of winter season operations in the congested New York area.

Such is the prediction of N. C. Beuter, chief controller at the New York center, based upon the increased efficiency of traffic control operations evident after only a few weeks use of the new remote stations.

Whether or not the new remote VHFs meet his present expectations, Beuter is certain that they will cut delays and cancelations sufficiently to give airline winter season revenues a needed boost.

► **Expanded VHF Coverage**—The three remote VHFs, two located at East Scranton and one at Westchester, Pa., connected by telephone lines to the New York Control Center, plus three new local VHF channels added a month earlier at the ARTC Douglaston (Long Island) site, have tripled the number of VHF channels available to New York ARTC for airline use.

The New York center has a total of 13 channels—12 VHF, one UHF. Two of the local VHF channels and the UHF channel are for military aircraft.

► **Direct Communication**—ARTC controllers now have both the range and the number of channels to enable them to directly control inbound and outbound New York traffic operating on IFR (Instrument Flight Rules) at distances up to 175 miles. This replaces the previous round-about procedure of routing traffic control instructions through individual airline controllers and radio operators.

Prior to 1949, an ARTC controller who wanted to instruct an airliner to change altitude, for example, had to call the airline's dispatcher. The airline dispatcher might then write out the instruction and give it to the radio operator who would in turn call the pilot, giving ARTC instructions. The pilot's acknowledgement had to filter back through the same chain.

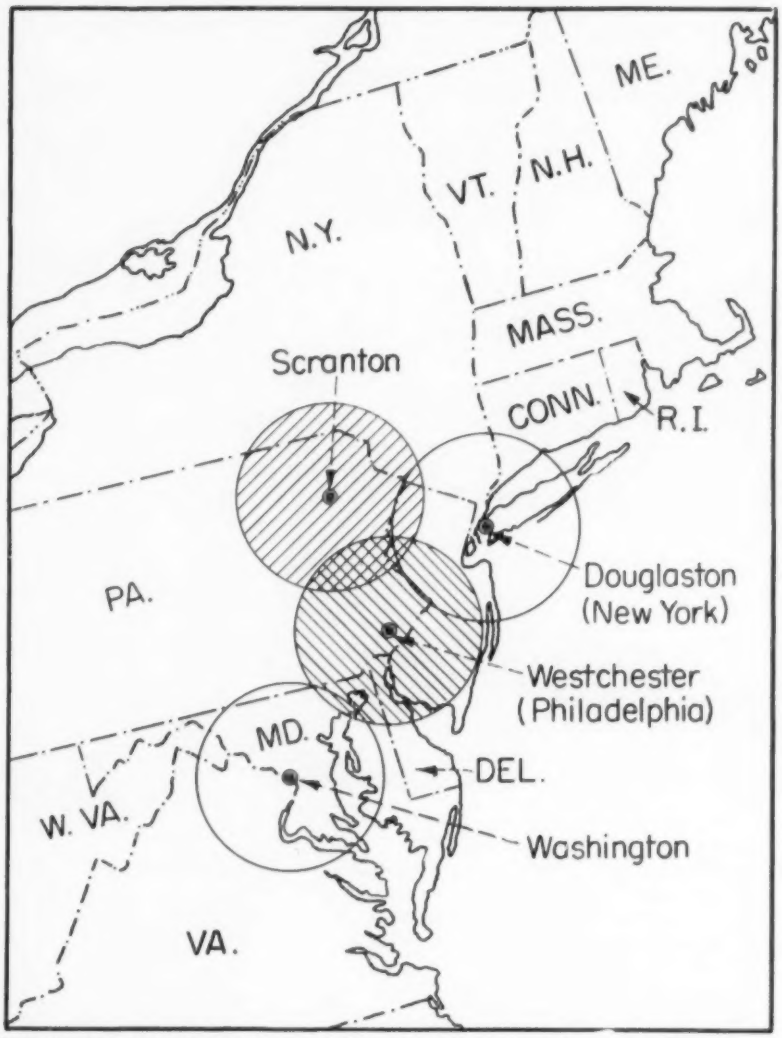
As a result, it might be five minutes (less if the airline dispatcher and radio operator were the same man) before the ARTC controller could be certain that the airspace was now vacant so that he could assign it to another aircraft. This new assignment might take another two to five minutes.

A long series of such delays in IFR weather wasted valuable airspace with the result that traffic flow had to be curtailed and some flights had to be canceled for lack of assignable airspace.

► **Shortcut Needed**—As 300-mph. aircraft came into widespread use and air traffic mushroomed, ARTC needed a shortcut. It came, about four years ago, when the first ARTC VHF transmitter/receiver was installed at the New York center, enabling it to "work" aircraft directly.

This single channel proved so effective in speeding traffic flow that one UHF and five additional VHF channels were added, with three of the VHF channels for airline traffic control.

Growing congestion in the multi-



EXPANDED COVERAGE is provided N. Y. Traffic Control by new VHFs (shaded).

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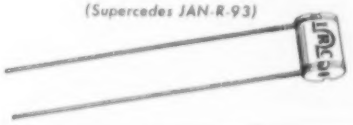
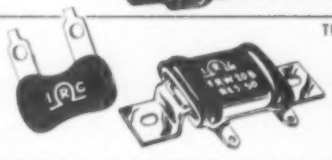
NAME AND DESCRIPTION	SPECIFICATIONS
TYPE BT ADVANCED FIXED COMPOSITION RESISTORS ⅓, ½, 1 and 2 watts. IRC filament-type resistance element. Anchored, non-loosening leads. Extra-Bakelite-sealed against moisture or grounding. Low operating temperature. Excellent power dissipation.	JAN-R-11 Specification *(Type BTS meets rigid G Characteristic)*
TYPE BW INSULATED WIRE WOUND RESISTORS ½ and 1 watt inexpensive wire wound resistors for low range requirements. Small and completely insulated. Wire resistance element is uniformly and tightly wound on an insulated core.	JAN-R-184 *(Characteristic B)*
NEW TYPE BOC BORON-CARBON PRECISTOR ½ watt. Latest development in stable film-type resistors. Combines high accuracy and long-time stability. Reduces temperature coefficient of conventional deposited carbon resistors. Replaces high value wire wounds at substantial savings in cost and space. Essential in critical electronic and avionic circuits.	MIL-R-10509A Specification
TYPE DCC DEPOSITED CARBON PRECISTOR ½, 1 and 2 watts. Latest advance in small-size, high stability resistors. Ultimate in non-wire-wound accuracy. Stable over long periods. Assures low voltage coefficient, low capacitive and inductive reactance in high frequency uses. Efficient and economical in modern electrical and electronic circuits.	MIL-R-10509A Specification *plus latest JAN Specification Proposal*
TYPE WW PRECISION WIRE WOUND RESISTORS Severe cycling and 100 hour load tests result in almost no resistance change. New winding forms hold more wire for higher resistance. New winding technique eliminates shorted turns. New type insulation withstands humidity. New terminations are rugged, strain-free.	MIL-R-93A Specification *(Supercedes JAN-R-93)* 
TYPE MF SEALED PRECISION VOLTMETER MULTIPLIERS Completely impervious to humidity. Interconnected precision wound coils are encased in glazed ceramic tube—hermetically sealed. Multiple-layer windings insure resistor against breakdown. Compact, rugged, stable, easy to install.	JAN-R-29 Specification
POWER WIRE WOUND RESISTORS For exacting, heavy-duty applications. Exceptional mechanical strength; withstand severe vibration. Available in two coatings; a variety of ratings, sizes and terminals; fixed and adjustable types; tubular or flat.	 TUBULAR PWW'S —JAN-R-26A *(G and J Characteristics)* FLAT FRW'S—Correspond to JAN-RW Types

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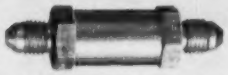

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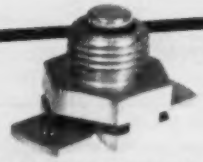

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airport New York area prompted CAA to schedule the installation of three additional local VHF channels for completion by late 1952. These were expected to relieve overburdened local channels, but in so doing would shift the traffic-flow bottleneck out beyond a radius of 50-75 miles from New York (the line-of-sight range limitation of the local VHFs). Beyond this range, ARTC would have to work its aircraft through the airline dispatchers and radio operators. Remote VHFs seemed to be the logical solution, but none had been previously budgeted.

▶ **On a Shoestring**—With strong backing by interested airlines and the Air Transport Assn., CAA rounded up about $5,000 and three "surplus" transmitters and receivers. New York's center got the go-ahead in November for its remote VHFs.

To hold costs down, the remote transmitters and receivers were located on the same Scranton and Westchester mountaintop sites used for CAA's omnirange stations. The choice of existing VOR sites made it possible to complete the installations in a month, before bad weather set in. It also offered economies from a maintenance standpoint.

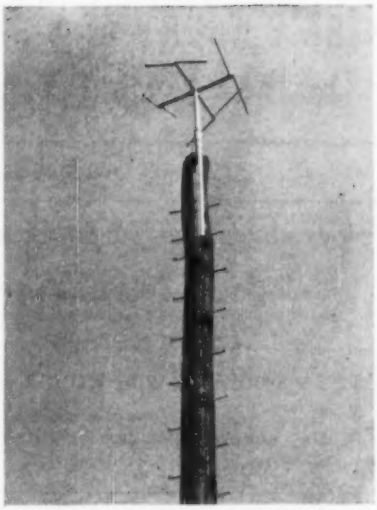
The Scranton site gives ARTC up to 175 miles coverage along the heavily traveled New York to Chicago airways; Westchester gives slightly less range on the Washington to New York airways.

In the first few days of operation, ARTC's "remote voice" surprised more than one pilot. Told to contact the New York center while still 100 miles out, an unsuspecting pilot would turn his receiver volume control to its maximum setting in order to pick up the distant Douglaston transmitters. When ARTC replied with one of its remote stations, it almost "blasted" the pilot out of his seat.

▶ **Universally Popular**—When the initial surprise is over, the pilots are as enthusiastic as the ARTC controllers over the new remote VHFs, AVIATION WEEK was told. Pilots like the new arrangement because, with a single setting of their receivers, they hear all ARTC instructions to other neighboring aircraft on the same airway. (Previously, a pilot tuned to his own company frequency would miss transmissions to aircraft of other airlines.)

This feature not only gives the pilot greater peace of mind, but serves to alert him for his own ARTC instructions. For example, when a United Air Lines pilot cruising at 8,000 ft. near Allentown hears ARTC tell a nearby American Airlines pilot to descend from 7,000 to 6,000 ft., the UAL pilot is alerted that he will shortly be told to drop down into the vacated airspace.

Sitting alongside controller Joseph Nolan in the New York ARTC center, we watched him ladder down two aircraft (through a 1,000 ft. interval) within 15 seconds—an operation that might have required 5 to 10 minutes under the old arrangement.



SIMPLE ANTENNA of new VHF and . . .

COMPACT equipment make for economy.

▶ **Optimism**—This precise and immediate control of aircraft within a 150-175 miles radius is what prompts Beuter to predict that en route delays will be largely, if not entirely, eliminated this winter in the New York area.

Watching Nolan talk directly with east-bound traffic, it is easy to understand Beuter's enthusiasm. It also explains why CAA is already at work installing another remote VHF at Buffalo for use by the Cleveland ARTC center.

▶ **Remote VHFs and Radar**—ARTC controllers speak longingly of what they could do if they had "radar vision" equal in range to their new "VHF voice." Operating without radar at present, en route aircraft at the same altitude must be separated by a minimum of 10 minutes flying time (30 to 60 miles).

With a long-range radar, ARTC could safely reduce this en route sepa

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tion to 3 to 6 miles, providing a ten-fold increase in airspace during IFR weather. But present air surveillance radar used for airport approach control at LaGuardia has a range of only 25 to 30 miles.

For the past year, CAA has operated a Radar Traffic Control Center at Washington National Airport using nearby military radar to extend its radar vision beyond the normal ASR range. This set-up has cut delays of incoming aircraft from an hour or more (under bad weather conditions) to a maximum of 21 minutes, according to Charles F. Horne, Civil Aeronautics Administrator. Horne says that departure delays have been almost eliminated.

Horne says that CAA hopes to set up a similar radar control center at New York and Chicago in 1953 by tieing in with long-range military early warning radar (MEW) operated for air defense. The problem appears to be one of finding funds necessary to set up microwave links to transmit the MEW radar picture from air defense headquarters to ARTC centers.

If CAA is successful in providing extended radar surveillance for its New York ARTC center, it will already have the extended VHF voice it needs to exercise speedy and direct control, thanks to its new remote VHF stations.

FILTER CENTER

▶ **Radar Controversy Report Due**—Prof. John S. Marshall, McGill University's expert on weather radar, is expected to report to Air Transport Assn. and Aeronautical Radio Inc. this month on his study of advantages of 5-6-cm. (wavelength) radar versus 3-cm. for storm-warning use. The question has stymied the Arinc committee preparing a specification for airline airborne radar. Although 5-6 cm. is generally considered superior to 3 cm. for weather purposes, it is a new band for which few components are now available. In contrast, 3-cm. (X-band) components are off-the-shelf items with many manufacturers.

▶ **Radar & ILS Basics**—Fundamentals of radar and their application to surveillance, approach (GCA), and en-route ground radar stations are effectively presented for the non-technical reader in a new (second) edition of the CAA's Bulletin No. 6, Airways Operations Training Series. The booklet sells for 30 cents from the Superintendent of Documents, U. S. Govt. Printing Office, Washington 25, D. C. The Third edition of Bulletin No. 1 in the series, which describes the fundamentals and operation of the instrument landing system (ILS) is also available from the same source for 20 cents.

▶ **New Technical Bulletins:**

• **Direct-writing recorder** for laboratories, uses inkless method of recording, provides rectangular writing coordinate, and uses high-torque galvanometer movements; described in a new booklet by Sanborn Co. (38 Osborne St., Cambridge, Mass.)

• **Automatic voltage stabilizers** consisting of an inductance-capacitance network in sizes rated 15 to 5,000 va. are described in General Electric's booklet GEA-5754. Principles of operation and specifications are included. (1 River Road, Schenectady, N. Y.)

• **Vibrator-choppers** with long-life gold contacts for converting d.c. to a.c. and vice versa and designed for operation between —65C and 85C are described in catalog 280B which lists new 1953 models. (Stevens-Arnold, Inc., 22 Elkins St., South Boston 27, Mass.)

• **Relays**, including hermetically sealed subminiature plug-in types, are described in new circular 1702-A. (Automatic Electric Co., 1033 W. Van Buren St., Chicago 7, Ill.)

• **Servo system components** such as small control motors, tach generators, miniature gear trains and servo amplifiers are described in new bulletin MC1. (Transicoil Corp., 107 Grand St., New York 13, N. Y.)

• **Lightweight amplifier-bridge**, newly developed for the Simmonds Pacitron fuel gage system, is described, complete with circuit diagrams and installation data, in a new four-page folder prepared by Simmonds Aerocessories, Inc. (105 White Plains Rd., Tarrytown, N. Y.)

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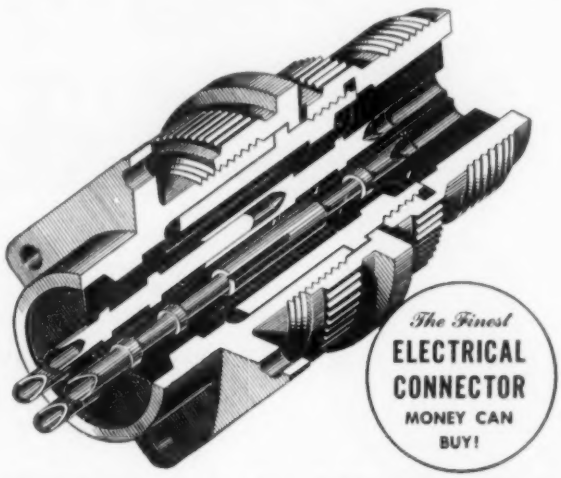

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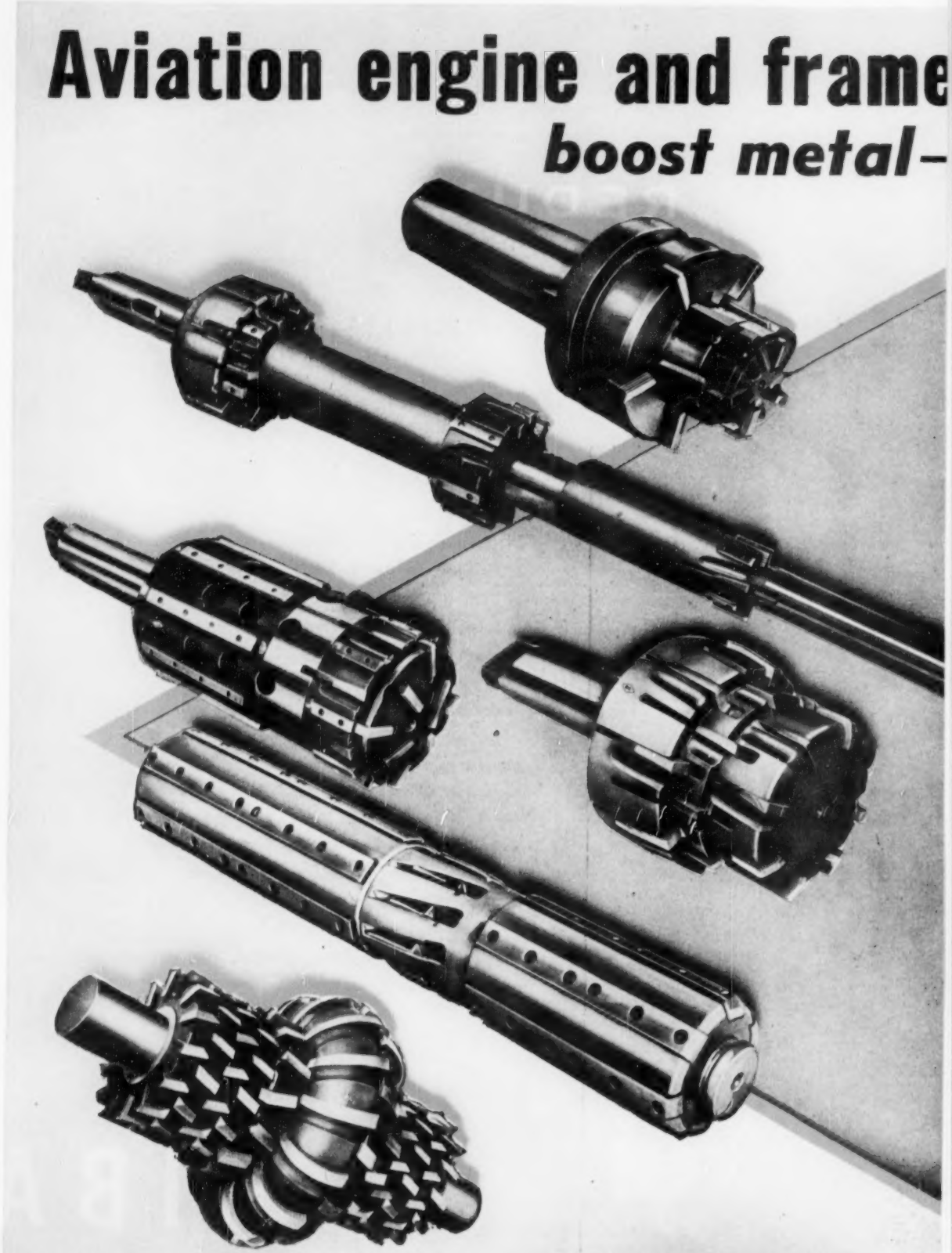

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Cash Dividend Record Of Scheduled Domestic Carriers

	Calendar Years				
	1952	1951	1950	1949	1948
American, common	$0.50	$0.50	$0.25	None	None
American, preferred	3.50	3.50	3.50	$3.50	$3.50
Braniff	None	0.50	0.25	None	None
Capital	None	None	None	None	None
C & S	0.75	0.65	0.50	0.35	None
Colonial	None	None	None	None	None
Continental	0.50	0.50	0.25	None	None
Delta	1.00	0.50	0.50	None	None
Eastern	0.50	0.50	0.25	None	None
National	0.50	0.25	None	None	None
Northeast, common	None	None	None	None	None
Northeast, preferred	1.00	1.00	2.00	1.00	None
Northwest, common	None	None	None	None	None
Northwest, preference	1.15	1.15	1.15	1.15	1.15
Pan American	0.50	0.50	0.25	0.25	0.25
TWA	None	None	None	None	None
United, common	1.50	1.50	0.75	None	None
United, preferred[1]	3.00	....	....	....	....
Western	0.60	0.50	None	None	None

[1] *Issued in March 1952.*
NOTE: Payments listed are per share.

Carrier Dividends Reach New High

But rate of return is still generally below what investors look for from established companies.

Cash dividends in the airline industry for 1952 again set a new record high, although up only slightly from 1951.

The 14 domestic trunk carriers are estimated to have paid an aggregate of some $12.6 million to stockholders last year, up approximately $175,000 from 1951. The 1952 cash disbursements to shareholders are in marked contrast to the $6.8 million paid in 1950 and $1.7 million paid in 1948 by the domestic airlines.

▶ **Individual Variations**—As with all averages and aggregate compilations, individual results are frequently camouflaged. During 1952, four airlines increased the rate of dividend payments on their common stocks while one omitted dividend disbursements completely. Only 10 domestic trunk carriers paid cash dividends compared to 12 for 1951, 10 for 1950, eight for 1949 and but four for 1948.

Ironically, Mid-Continent which paid 50 cents a share in the three-year period 1949 to 1951, was absent from the dividend lists in 1952 by virtue of its merger with Braniff. The latter carrier omitted dividend payments in 1952 after paying 50 cents a share in 1951.

There were no new faces in the dividend lists for 1952, although National doubled its rate from 25 cents to 50 cents a share. Delta went from 50 cents to $1.00, C&S went up 10 cents to 75 cents and Western increased its rate to 60 cents from 50 cents.

The non-dividend payers in 1952, in addition to Braniff and representing carry-overs from 1951, were Capital, Colonial, Northeast common, Northwest common and TWA.

TWA, however, declared a stock dividend of 10% payable Jan. 15, 1953. Both Capital and TWA made significant improvements in their financial positions and, once capital expenditures are provided for, may make cash distributions to stockholders in 1953.

Colonial has the distinction of being the only trunkline failing to pay a cash dividend throughout its entire corporate history.

The accompanying table reveals the record of all cash dividend payments made by the scheduled certificated carriers for the five-year period ending with 1952. Disbursements are reduced to a per-share basis and cover payments made on common and preferred shares now outstanding.

Obviously, the size of the individual company's capitalization measures the total dollar distribution to shareholders. For example, American's 50 cents per share on the common represents a total outlay of about $3,267,000. Yet, a $1.00-per-share distribution by Delta represents a total payment of but $600,000. Similarly, Pan American's 50-cents-per-share distribution represents a total payment of more than $3,071,000 to its shareholders.

▶ **Preferreds All Paid**—All outstanding senior equity issues paid their regular dividends when due in 1952.

American's 400,000 shares of 3½% preferred stock accounted for cash distributions of $1.4 million.

United's new issue of 223,865 4½% will account for annual payments of slightly more than $1 million. The company previously had a preferred stock issue with the same dividend rate. This was called during March to pave the way for new financing which was successfully completed.

Other preferreds outstanding are represented by Northwest and Northeast senior equity issues with dividend payments being made as due last year.

▶ **Common Yield Low**—While dividend payments for airline common stocks have been improving, the yield to stockholders remains quite low and compares most unfavorably with the return received by shareholders in other major U.S. industries. For example, at current prices the following yields prevail for those companies now paying cash dividends on their common stocks:

- American, 3.3%.
- Eastern, 2.0%.
- United, 5.1%.
- Pan American, 2.5%.
- C&S, 4.0%.
- National, 3.6%.
- Western, 5.1%.

Established industrial enterprises with stability in earnings abound with dividend payments averaging 6% and better.

▶ **Growth Feature**—Irregular and limited dividends have been characteristic of the air transport industry in the past. The constant expansion of the air carriers necessitated almost continuous reinvestment of earnings. Airline equities have not, in the past, found their principal appeal through the immediate income they may afford. Their main attraction has been in the growth qualities and ultimate degree of financial strength attainable by the companies they represent.

But the fact remains that to compete for investment consideration among other industrial groups, the air carriers may be compelled to provide a current measure of income return to stockholders approximating that found among other industrials.

—Selig Altschul

MONSANTO
CHEMICALS – PLASTICS
SERVING INDUSTRY WHICH SERVES MANKIND

To protect its new fleet of million-dollar Douglas DC-6B's, Western has specified that all of them will carry fire-resistant Monsanto Skydrol* in the cabin superchargers. These new planes are for service on the Pacific Coast, and between California and Minnesota.

Western is the 15th major airline to adopt this safe, noncorrosive hydraulic fluid which is unique in its field.

Here's a digest of Skydrol's outstanding performance features:

Reg. U. S. Pat. Off.

SKYDROL IS...
- ...nontoxic
- ...noncorrosive
- ...stable at required operating temperatures and pressures
- ...fire-resistant

SKYDROL IS USED BY...
15 major airlines, domestic and foreign: American, United, National, Delta, Braniff, Western, Pan American, Panagra, Slick, Transocean, Swissair, LAI, CMA, PAL, KLM

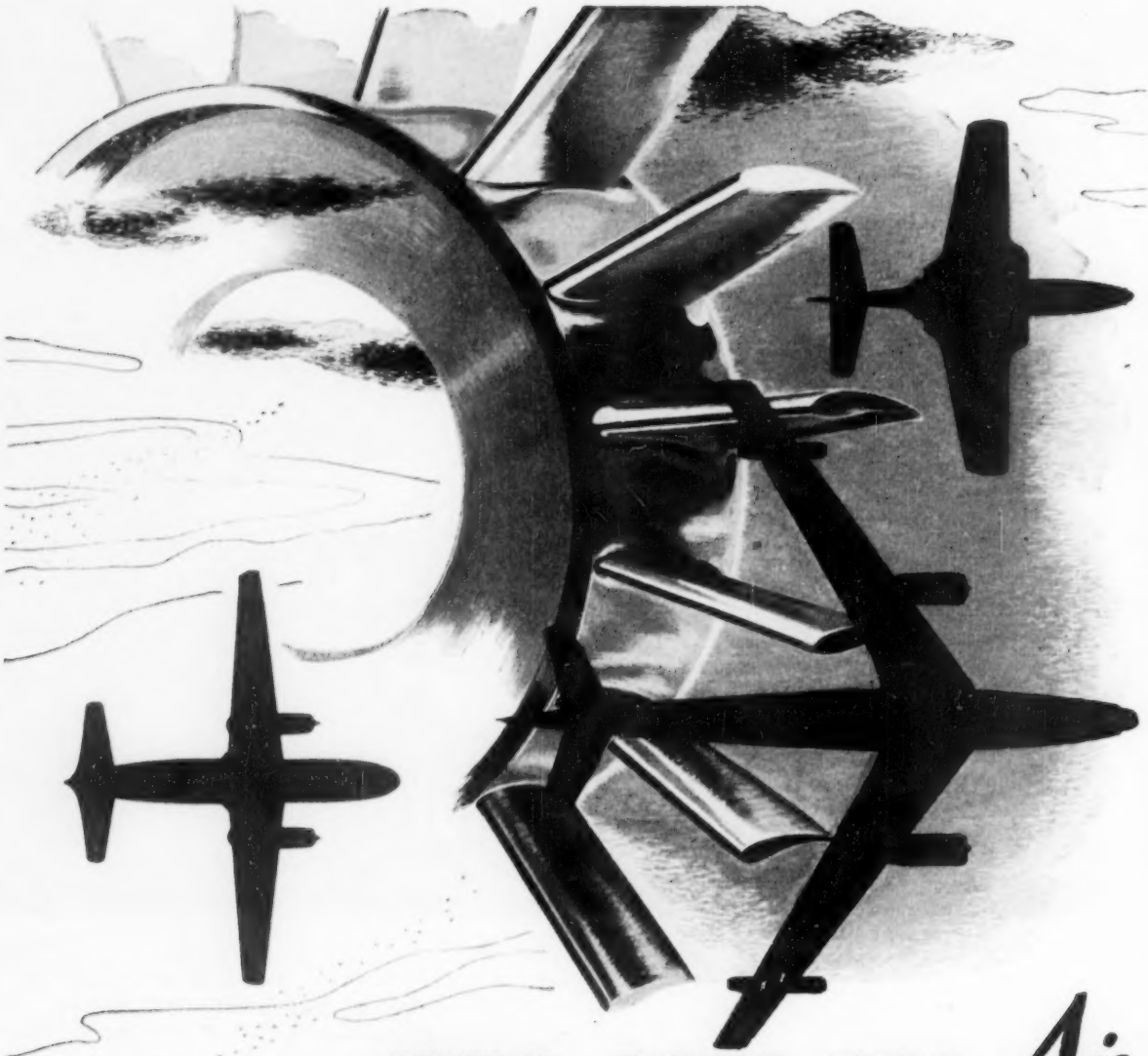
SKYDROL HAS...
logged approximately one and one-half million hours aloft in cabin superchargers and 100,000 hours in hydraulic systems

SKYDROL HAS...
double the lubricity of conventional hydraulic fluids

SKYDROL...
extends the service life of pumps, cuts maintenance costs

Skydrol is the only fire-resistant fluid which can be used in both cabin supercharger and hydraulic systems, as well as oleo struts. Ask for information on Monsanto's Pydraul* F-9, fire-resistant fluid for hydraulically operated industrial equipment.

THIS BOOK, containing complete Skydrol specifications and test data, will be sent to airline officials or aircraft owners on request. Write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 800 North Twelfth Blvd., St. Louis 1, Missouri.



WHO PUTS THE *Air*

Putting air to work *inside* aircraft is a Stratos specialty. Stratos designed and manufactured pneumatic equipment is serving vital functions in many military and commercial aircraft. Whether it be the pressurizing and air conditioning of a modern transport, cooling the cockpit of a sonic fighter or operating indispensable accessories in a jet bomber, Stratos precision-engineered equipment meets the requirement. Stratos pressurization and cabin air conditioning systems are used by leading domestic and international airlines. Stratos air-cycle refrigeration units cool the fastest Air Force and Navy jet fighters and bombers. Light-weight Stratos air-turbine drives provide dependable power for accessories in jet night fighters and bombers.

STRATOS

TYPICAL *STRATOS* PRODUCTS

TP15-2
Air Turbine Drive
For Driving 9kva Alternators

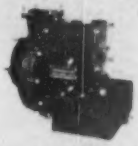
CFT25-3
Mass Flow and Temperature
Control Valve

NUR60
Air Flow Range
40 to 100 lbs/min

NUR30
Air Flow 25 to 40 lbs/min

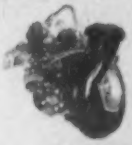
IN AIRCRAFT

BUR20
Air Cycle Refrigeration Package
For use with S20
Cabin Supercharger



S20
Cabin Supercharger
Nominal Air Flow to 30 lbs/min

B60
Air Cycle Refrigeration Unit
For use with S60
Cabin Supercharger



S60
Cabin Supercharger
Nominal Air Flow to 78 lbs/min

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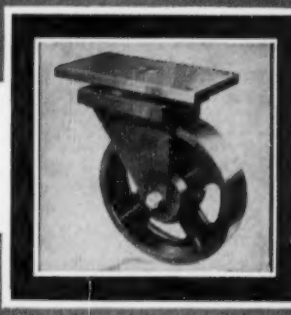

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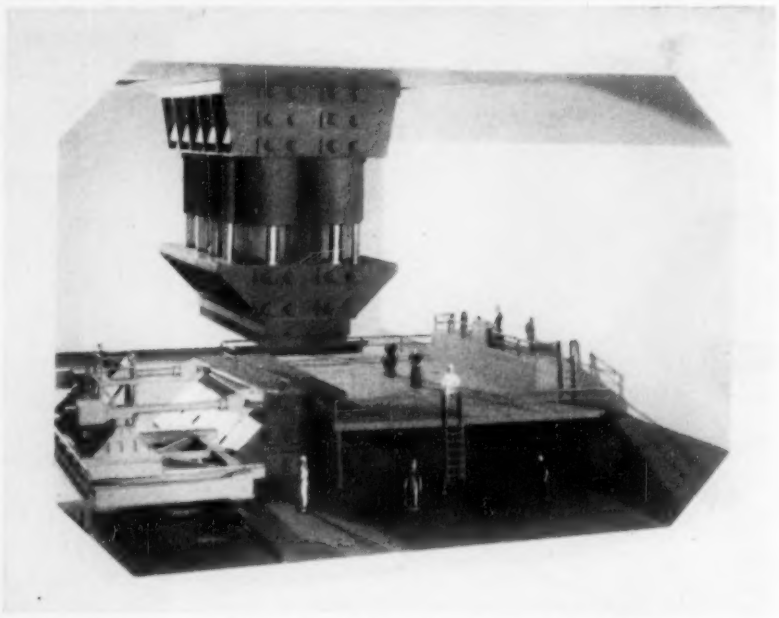

ALL-AROUND ACCESSIBILITY would be a major advantage of new big press.

New Approach to Big Press Design

Throatless type could be built in sizes over 75,000 tons with present construction equipment and tools.

An ingenious plan for a huge, throatless forging press with an integral housing structure keys in with the aviation industry's fast-approaching giant-tool era.

The throatless design will make it possible to build presses of even more than 75,000-tons capacity with present-day machine tools and construction equipment, according to its sponsors, Throatless Press Co., Cleveland.

► **No Tierods**—A new concept in hydraulic press design, this development contemplates the creation initially of a 75,000-ton unit accommodated in a massive block of prestressed concrete. This would eliminate the need for head and base-frame castings and the large-diameter, encumbering tierods connecting the press head and bed, to allow all-around, unrestricted access for placement of dies and work and for manipulator operation.

Advantages of the throatless design are seen extending to both large and small presses—units larger than the 75,000-ton size and those as small as 20,000 tons could make economical and practical use of the design, Throatless Press says.

The use of unitized construction for the main elements of the throatless press will make it possible to limit the size of individual press parts to a point which would eliminate machining problems and transportation difficulties, it is claimed.

No single piece of a 75,000-ton press would be larger than the head of a German 13,000-ton extrusion press, Throatless Press reports.

► **How It Started**—Idea for the throatless arrangement originated with C. A. Van Dusen of Van Dusen Engineering Co., Escondido, Calif., according to Throatless Press. In 1946, he envisioned the installation of mammoth presses in caves. This would not only protect against aerial attack but allow suspension of the upper press-element from a natural rock roof and do away with the bottleneck caused by scarcity of massive steel interconnecting elements. Apparently, this did not appear practical.

Van Dusen assigned his rights to the Austin Co., engineering and construction firm of Cleveland, and Hydraulic Press Mfg. Co., Mt. Gilead, Ohio. These two organizations have teamed to form the Throatless Press Co., for the development, production and erection of presses providing the 360-deg. access arrangement.

So far no order has been placed for

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HYDRAULIC ACTUATORS

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Breeze has the engineering staff, the shop capacity and special test equipment to produce hydraulic actuators of all types.

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BREEZE

HYDRAULIC ACTUATORS

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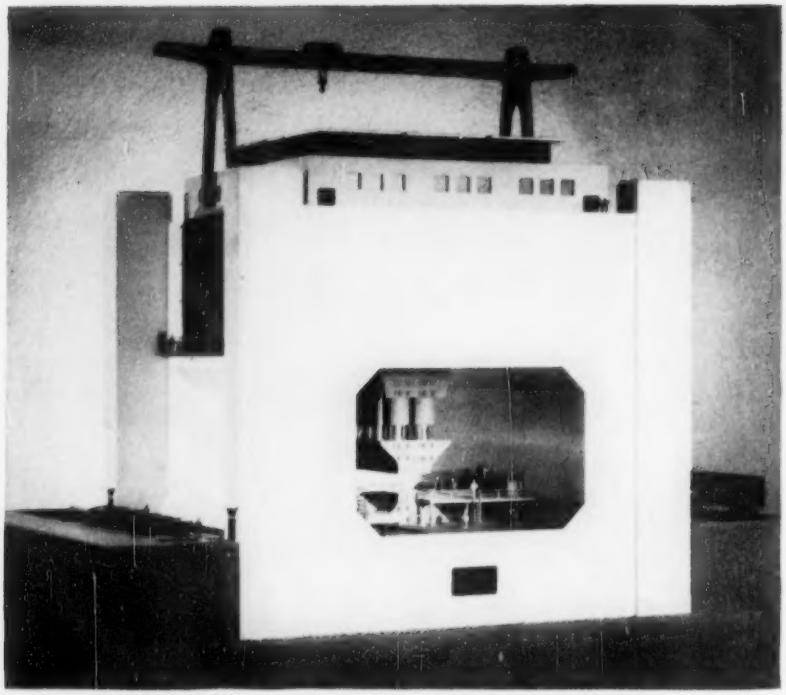


HUGE GANTRY CRANE on roof could be used for raising gas cylinders.

such a press, but the plan will undoubtedly gain the attention of the military. According to preliminary estimates, installed cost of a complete 75,000-ton throatless press, including housing structure and all auxiliary equipment—estimated at $25 million—would be substantially less than for a conventional 75,000-ton unit with comparable auxiliaries, erected on foundations and with the required enclosure, the company reports.

▶ **Working Space**—Actual dimensions have not been announced for the concrete mass which would be required to support, suspend and completely house the required press elements and operations, and provide the counter-force to resist the tremendous concentrated pressure developed in forming huge aircraft components.

However, scale model studies indicate a structure with an over-all height of about 180 ft.—30 ft. of which would be located below the press-room hollow. This press room would have an unobstructed span of 80 ft., clear height of at least 50 ft. and a length of about 120 ft. The press room could be extended to accommodate additional forge units. Wide open aisle areas around the press installation would make it easy for manipulators to load and unload from any direction.

▶ **Equipment Features**—Because the press head would be carried on the press-room ceiling, pressure piping lengths would be short, boosting operating efficiency and minimizing danger to operating personnel. High up on exterior walls, a series of 90-ton high-pressure bottles would serve as accumulators to build up the hydraulic pressures required for press operation. A 100-ton-capacity gantry-type crane, carried on the roof, would handle pressure vessels, and miscellaneous equipment installed on the roof deck.

The Throatless Press company claims that there would be few restrictions on press location with this type of makeup. Soil which could sustain the required bearing load is available in most parts of the country; concrete materials are generally available anywhere, easily transported to the construction site.

Because the press components generally would not be much larger than have regularly been made for smaller presses, transportation of these parts by rail would be feasible.

▶ **Large Multiples**—Economy of a single concrete frame is also seen for a multiple press installation. By synchronizing the time of the pressure stroke, a number of heavy presses could be installed under a single concrete mass.

Another feature of the throatless arrangement is the simplicity with which inert gas chambers could be used for enclosing dies when forging materials required this protection.

In non-forging applications, the throatless feature is seen offering another advantage. For rubber-pad forming of sheet and plate, the wide open space around the machine would be a big asset for adequate perimeter reinforcement of high-unit-pressure rubber pad holders. —IS

Navy Contracts

The following contracts were announced recently by the Navy's Aviation Supply Office, 700 Robbins Ave., Philadelphia 11.

Air Associates, Inc., Teterboro, N. J., valve, hydraulic, 120 ea., $29,773.

Spen & Co., Inc., Henry, 1995 Pitkin Ave., Brooklyn 17, trailer, oxygen type No. 2, 20 ea., $31,612.

General Electric Co., 1405 Locust St., Philadelphia, 65 items used on instruments for various aircraft, $38,302.

Daiber, E., 5105 Dension Ave., Cleveland, pitot tubes, 2,293 ea., $38,522.

Eclipse-Pioneer div., Bendix Aviation Corp., Teterboro, bearing, $79,271.

Whittaker Co., Wm. R., Ltd., 915 N. Citrus Ave., Los Angeles, valve assembly, 445 ea., $109,599.

Aero Products div., General Motors Corp., Municipal Airport, Dayton 1, actuator assembly, $142,148.

Western Coating Co., P. O. Box 227, Elyria, Ohio, compound preservative, 90,000 lb., $44,572.

Stein Bros. Mfg. Co., 1401 W. Jackson Blvd., Chicago 7, vest-assembly, 4,532 ea., $69,113.

Hydro-Aire Inc., 3000 Winona Ave., Burbank, valve, fuel selector, 330 ea., $55,341; pistons and shafts, $59,913.

Magnavox Co., Ft. Wayne, Ind., solenoid for aviation armament, $90,090.

Douglas Aircraft Co., Inc., El Segundo, Calif., maintenance parts for AD aircraft, $130,392.

Scintilla Magneto div., Bendix Aviation Corp., Sherman Ave., Sidney, N. Y., ignition spare parts, $205,629; spare parts used on P&W engines, $69,547.

Solar Aircraft Co., 2200 Pacific Highway, San Diego 12, stack assemblies, $281,060.

Bendix Products div., Bendix Aviation Corp., 401 Bendix Drive, South Bend, maintenance parts for various aircraft, $67,793.

Arrowhead Rubber Co., 11634 Patton Rd., Downey, Calif., ducts, boot and sleeves, $26,462.

Champion Spark Plug Co., 900 Upton Ave., Toledo 1, spark plug, 51,000 ea., $65,739.

Tanenbaum Textile Co. Inc., 460 Fourth Ave., New York 16, cloth, nylon, 140,000 yd., $59,360.

B. G. Corp., 136 W. 52nd St., New York 19, ignitor plug assembly, 5,488 ea., $47,197.

Barrett division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, phenol, 150,000 lb., $28,500.

Thompson Co., A. H., 3rd & Cedar Sts., Berkeley, Calif., thinner, 221,805 gal., $153,045.

Senn, George, Inc., 2200 E. Westmoreland St., Philadelphia, thinner, 250,000 gal., $168,000.

Mead Aviation Equipment Co., 457 Mulberry St., Trenton, N. J., paulin, rubber-coated nylon fabric, $282,472.

Simmonds Aerocessories, Inc., 105 White Plains Rd., Tarrytown, N. Y., various assemblies for various aircraft, $31,138.

United Aircraft Products, Inc., 1116 Balander Ave., Dayton, valve assembly, oil, $26,111.

Federal Enterprises, Inc., 8700 S. State St., Chicago 19, charger, $26,899.

Lewis Eng. Co., 339 Church St., Naugatuck, Conn., bulb thermometer, $26,962.

Libbey, Owens, Ford Glass Co., Fiber Glass div., Nicholas Bldg., Toledo 3, glass fibers, superfine, 465,000 lb. $567,393.

Scovill Mfg. Co., Inc., A. Schrader's Son div., 470 Vanderbilt Ave., Brooklyn 38, gauging device, 3,200 ea., $42,687.

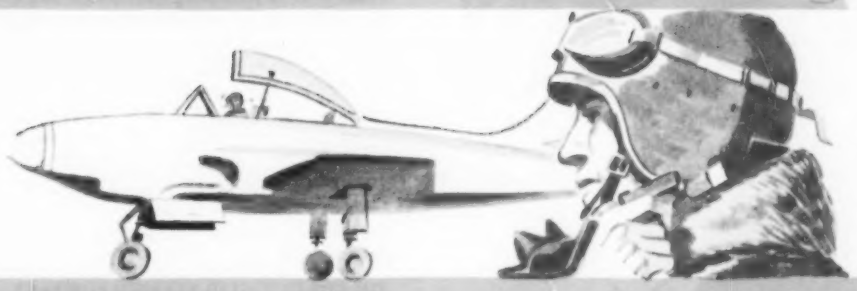
Collins Radio Co., 11 W. 42nd St., New York 18, relay assembly, 2,700 ea., $65,772.

United Aircraft Corp., Hamilton Standard div., East Hartford 8, Conn., parts for maintenance of propeller installation, $192,440; parts for propeller and de-icer installation, $458,741; maintenance parts for air conditioning system, $33,378.

United Aircraft Corp., Pratt & Whitney Aircraft div., East Hartford 8, Conn.,

first in our planning...

THE MAN IN THE COCKPIT!



Since Korea multiplied an already heavy demand on our services, we at Eclipse-Pioneer have gone all-out to meet the new challenge. Besides greatly enlarging our own facilities, we've created a network of 23 complete unit sub-contractors and over 2300 first tier parts sub-contractors to help us deliver the goods. As a result, Eclipse-Pioneer production now stands at a record 514% of its pre-Korea level. But in all the acceleration of our plans . . . in all the haste to catch up with demand . . . we've never lost sight of one all-important fact. Our *first* responsibility is to the man on the spot—the man whose efficiency and, indeed, whose life depend so largely on the precision operation of our instruments and accessories. Because we cannot compromise quality with the pilot, our responsibility goes far beyond just multiplying manpower, equipment and facilities. In other words, our timetable for growth must *always* be based on the maximum that can be accomplished *without sacrifice in the high quality of our precision products!*

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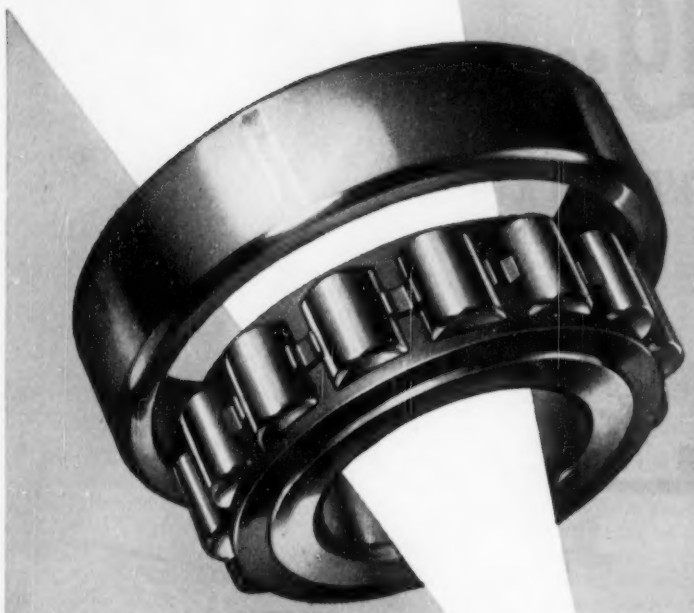

Jet planes flying faster than the speed of sound . . . turbines spinning at a rate of 12,000 RPM . . . temperatures as high as 500° F.—with a minimum of lubrication! Those are the punishing demands today's modern aircraft put on bearings! Small wonder then that major manufacturers of jet engines standardize on Bower aircraft bearings. Precision-built to tolerances measured in millionths of an inch, these quality bearings operate with complete efficiency at peak speed and temperature loads. What do you make? If your product demands top-quality bearings you'll be wise to specify dependable Bower bearings.

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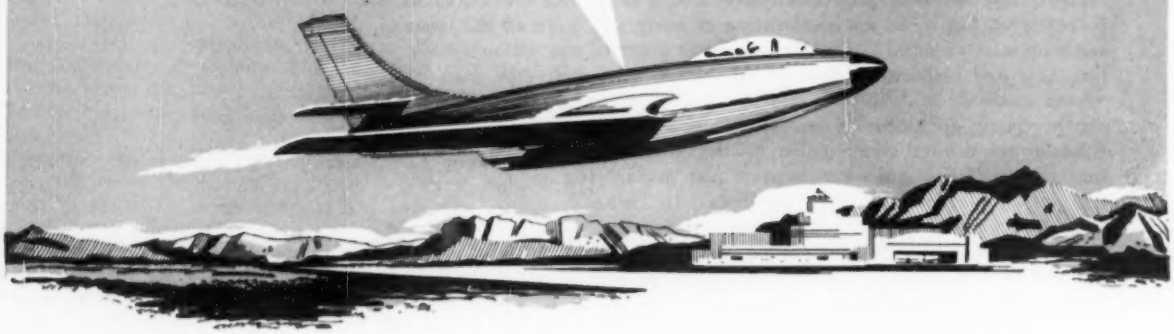

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maintenance and overhaul parts for turbojet engines, $1,329,500; maintenance and spare parts for P&W engines, $4,665,261; spare parts for P&W engines, $29,648; engine maintenance spare parts, 1,000 ea., $254,520; stand, 60 ea., $125,802; spare parts for use on P&W engines, $322,586; support assembly, 266 ea., $30,901.

Air-Lock, Inc., 108 Gulf St., Milford, Conn., adapter assembly, 15,400, $31,570.

Lord Mfg. Co., 1635 W. 12th St., Erie 6, cores, $208,294.

Vickers, Inc., 1400 Oakman Blvd., Detroit 32, hydraulic motor assembly, 547 ea., $184,989; maintenance parts for pump assemblies, $218,111; pump, hydraulic engine driven, 357 ea., $196,673.

Fuller & Co., W. P., 301 Mission St., San Francisco 19, pigment, red lead, 240,000 lb., $40,128; pigment, 180,000 lb., $30,546.

General Electric Co., Wire & Cable div., 1285 Boston Ave., Bridgeport, Conn., cable, $739,808.

Western Gear Works, Box 192, Lynwood, Calif., actuator, 177 ea., $202,881.

Aerol Co., Inc., 2424 San Fernando Rd., Los Angeles 65, wheel assembly, $99,739.

New Castle Products, Inc., 1711 "I" Ave., New Castle, Ind., engine cover, 249 ea., $77,058.

Goodyear Tire & Rubber Co., Inc., 1144 E. Market St., Akron, maintenance parts for F7U-3,-3P aircraft, $56,222; wheel assembly, $33,287.

Felters Co., 210 South St., Boston 11, felt, $32,306.

Airsearch Mfg. Co. div., The Garrett Corp., 9851-9951 Sepulveda Blvd., Los Angeles 45, valve and thermostat assemblies, $64,928.

Aerial Machine & Tool Corp., 38-27 30th St., Long Island City 1, pilots' belt, $49,410.

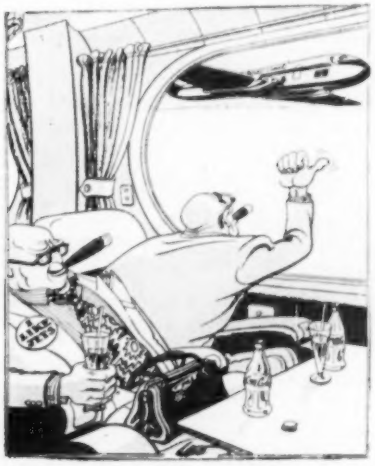
Aircraft Belt & Trim Corp., 2818 West Pico Blvd., Los Angeles 6, pilots' belt, 3,000 ea., $26,215.

Jones-Hamilton Co., 4600 Clement St., Oakland 1, Calif., thinner, 545,000 gal., $164,590.

Bristol Parts From Spain

(McGraw-Hill World News)

Madrid—Bristol Aeroplane Co. representatives have concluded a successful deal with Aviacion y Comercio to build Bristol spare parts in a new plant to be erected near Madrid's Barajas Airport. The British firm will control 25% of the stock in the new venture. The Bristol mission also sold six planes during its trip—four to Iberia Airlines and two to Aviacion y Comercio.



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—De Havilland Gazette

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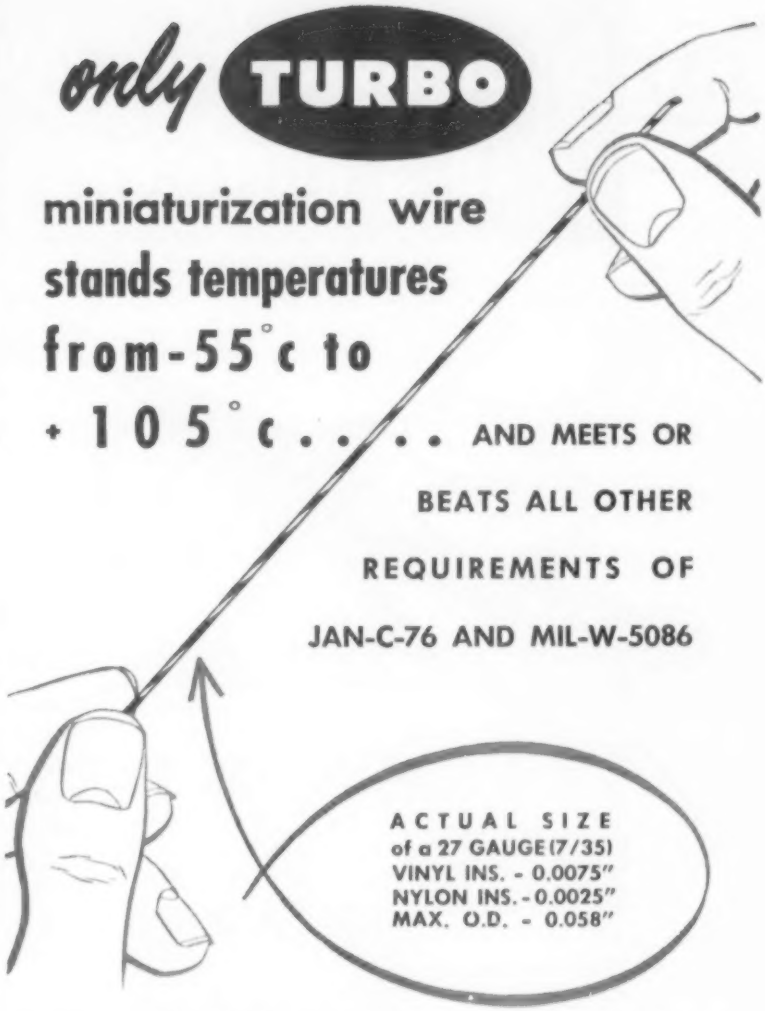

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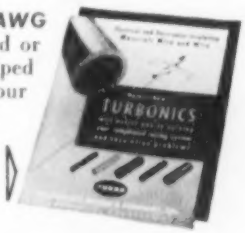
- ***TURBO MINIATURIZATION WIRE COMES IN AWG SIZES FROM 30 TO 12 GAUGE*** . . . in standard or flexible wiring . . . in solid colors, or candy-striped colors with 1, 2 or 3 tracer combinations, to fit your circuit coding needs.
- ***BULLETIN A-4662*** gives you more information about TURBO insulation. Ask for it when requesting your samples of TURBO Miniaturization Wire. Write Dept. A-1.



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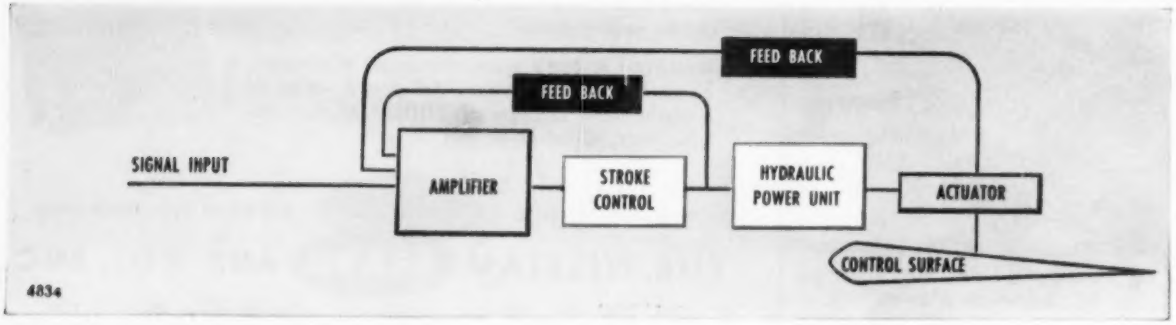
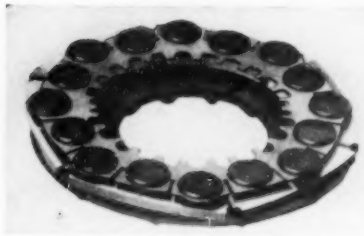




Ceramic-Base Lining Boosts Brake Loads

A new ceramic-base brake lining for heavy, highspeed aircraft has been announced by Bendix Aviation Corp.

The Cerametallic lining can withstand braking loads up to 50% greater than resin-base linings, Bendix says, and does not deteriorate at friction heat of 2,000F—1,300 deg. higher than the normal give-way temperature.

Cerametallic linings are expected to last in service about five times longer than conventional types and to cut in half time needed for brake re-lining.

Brake grabbing and fading is reduced by improved frictional stability of the ceramic material, according to manufacturer.

The lining allows construction of strong brakes in small landing gear that is designed to fit in thin wings of supersonic aircraft, Bendix says.

Cerametallic linings do not glaze with use, retaining the original coefficient of friction down to the last thickness of braking material, Bendix says.

Frictional qualities are said to be better than average in the new lining, yet the abrasive action is less than present types—increasing by 10 times the life of metal brake rotors that the lining bears against.

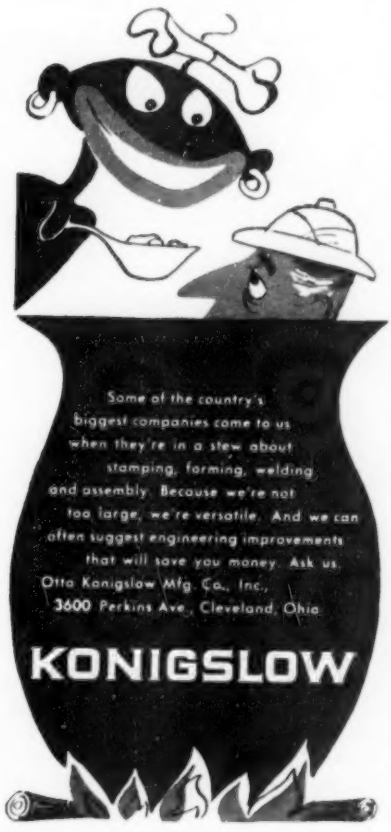
The manufacturer says ceramic is a better heat conductor than resin, rapidly transmitting high temperatures to stators that secure the linings and to the metal rotors. Better ventilation and a capacity to hold heat with little rise in temperature also contribute to cooler operation, Bendix says.

The lining is buttoned onto the periphery of both sides of a brake stator by a series of shallow disks.

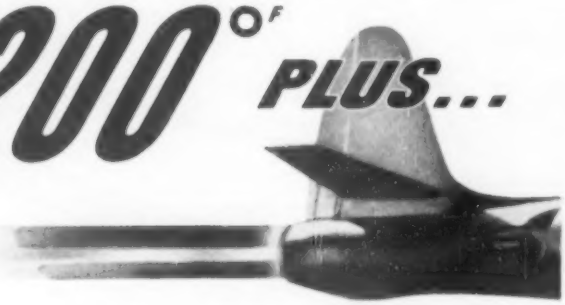
Bendix Products Division, Bendix Aviation Corp., South Bend 20, Ind.

Reynolds Buys Bauxite Unit

Reynolds Metals Co. has bought all assets of Berbice Col, Ltd., a subsidiary of American Cyanamid Co. in British Guiana, which produces an estimated 20,000 tons of bauxite each month, according to a Reynolds Metals announcement.


Some of the country's biggest companies come to us when they're in a stew about stamping, forming, welding and assembly. Because we're not too large, we're versatile. And we can often suggest engineering improvements that will save you money. Ask us.
Otto Konigslow Mfg. Co., Inc.
3600 Perkins Ave., Cleveland, Ohio
KONIGSLOW

1200°F PLUS...



is a challenge!

Such extreme heat... generated by a modern jet engine... demands not alone positive action of self-locking nuts, but equally important ...infinite care in servicing. Boots Hex-Lox, with fastening and locking features in one structural unit, maintains this function up to this intense 1200F. temperature ...resisting vibration and structural breakdown caused by frequent and radical changes. ➤ ➤ Available in standard sizes, the new light weight Hex-Lox permits high reusability and simplified maintenance.

A lock nut, to be efficient, must lock safely at any position on the bolt . . . thus eliminating the element of human error.

For any lock nut problem, consult Boots engineers... experimental quantities at no charge. Specific and necessary technical data on the complete Boots line available in our catalog.

Free

WRITE:

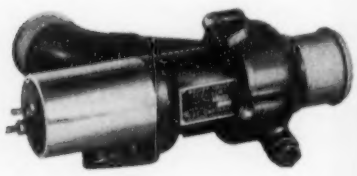
BOOTS Aircraft NUT CORPORATION
NORWALK, CONNECTICUT

TAKES THE

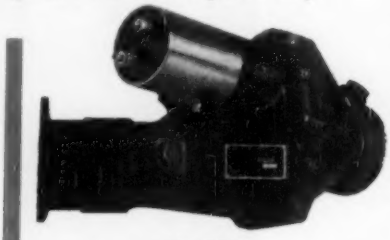
PRESSURE OFF!

Fuel tanks suffer from pressure, too—may overpressurize or collapse during extremes of high performance range. Fuel Vent and Dive Relief Valves by Carter, to permit high performance, are standard equipment on the North American Navy FJ-2 Fury and the Air Force F-86D Sabre Jet.

These special-purpose solenoid valves, designed and manufactured by Carter, are "fail-safe" and suitable for use in ambient temperatures of −65° to 250°F. Simplicity of operation insures dependability!



No. 5058
Fuel Vent Relief
2" Line Size
1 PSI △P at 200 CFM
Air Flow



No. 5059
Fuel Vent and Dive Relief
2" Line Size
¾ PSI △P at 100 CFM
Air Flow

Your inquiry stating your problem in this field is cordially invited.

2-404

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THE J. C. CARTER COMPANY

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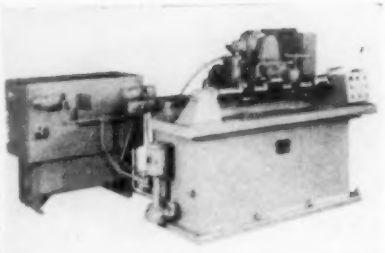


Shaft Hole Tube

A new Moline Tool Co. machine spotfaces holes in the cheeks of aircraft engine crankshafts.

The spotfacer is carried on a single spindle which travels horizontally along the length of the crankshaft which, in turn, is mounted in a fixture that permits it to be rotated along its axial centerline. In this way, any hole on the crankshaft cheeks can be turned so that it is in reach of the spindle which can then be brought up to the work on its horizontal traverse to execute the spotfacting.

The spotfacing spindle is manually indexed or positioned at the several crankshaft stations. The cutting tool is automatically brought to working position by electrically controlled hydraulic power, fed to the work and returned in an automatic sequence, by pressing a pushbutton. Emergency shutdown provisions also are provided at the pushbutton station.

The spotfacing machine is designed to be used in conjunction with two other Moline tools—a drill and a reamer.

Moline Tool Co., Moline, Ill.

Off-Shore Buying

(McGraw-Hill World News)

Paris—The off-shore procurement program is not bogging down and is moving along about as well as reasonably could be expected.

Off-shore purchases of aircraft may be announced soon. Aircraft evaluation is proceeding and the Mutual Security Agency says that no new unexpected difficulties have been encountered.

Certainly a far greater proportion of this year's billion dollars total for off-shore procurement will be committed well ahead of the June 30 deadline—end of U. S. fiscal year—than last year when a bulk of the $684 million total was placed during the month of June.

New Bonding Process

Rubber-to metal bonding process making possible better-fitting rubber parts with metal cores ground to close tolerances, such as nuts, bushings and valves, has been developed by Advance Rubber Co., Inc., 1702 Washington Ave., N. Minneapolis, Minn.

Now! the highest output in so compact a unit!

South Wind

CENTRAL STATION HEATING PACKAGE

...up to 600,000 BTU/hr.

The Choice of Canadair and Beech Aircraft Corporation

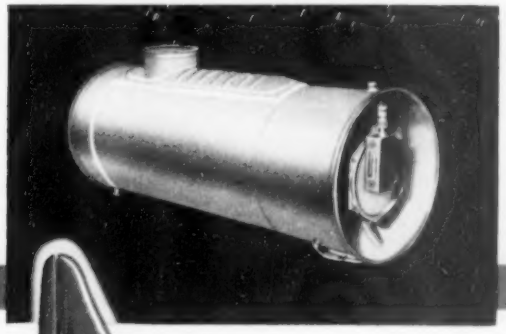
Leading aircraft makers specify South Wind Central Station Heating Package for these reasons: Compared with ordinary type heating systems, this new South Wind package provides a unit 25% to 50% *less* in weight; a unit 50% to 65% *less* in initial cost; a unit with up to 75% *less* service requirements, service costs and spare parts requirements.

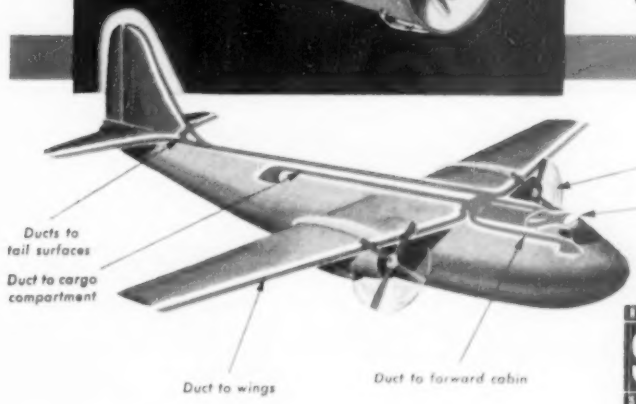
Ideal for large cargo planes, large multi-engine transports and ground heating in support of these aircraft, this new South Wind Central Heating Package affords savings never possible before in aircraft heating. Why not find out *why* yourself? Check—right now—the performance advantages shown below. Write South Wind for complete details *today!*

Only South Wind combines all these advantages in Aircraft Central Heating

1. **Ability to produce regulated outputs between 350,000 and 600,000 BTU/hr. constant heat flow.**
2. **Accommodates wide variation in ram air pressure.**
3. **Low pressure drop.**
4. **Reliable at 65 below zero F.**
5. **Proved in field and production experience.**

To Solve Your Heating Problems write today for the experienced counsel of South Wind's trained field engineers in adapting this or any other model in the complete South Wind line of heaters for commercial, military or civilian aircraft. Models range in capacity from 20,000 to 600,000 BTU/hr. South Wind Division, Stewart-Warner Corporation, Indianapolis 7, Indiana. Stewart-Warner Corporation of Canada, Ltd., Belleville, Ontario.




Two 600,000 BTU/hr. packages side by side in top of ship.
Air scoop
Ducts to tail surfaces
Duct to cargo compartment
Duct to wings
Duct to forward cabin

South Wind

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AIRCRAFT HEATING
AND THERMAL
ANTI-ICING EQUIPMENT
INERT GAS GENERATORS

WHEN WE WANT THE IMPOSSIBLE WE CALL THE FLYING TIGERS

says C. J. Isett, Division Traffic Mgr. LINCOLN MERCURY DIVISION of Ford Motor Co.

LOS ANGELES WANTS THOSE BODY PARTS ON THEIR ASSEMBLY LINE TOMORROW —— THAT'S IMPOSSIBLE!
NO PROBLEM, KAY - WE'LL SHIP BY FLYING TIGERS TONIGHT - THEY'RE AS FAST AND SAFE AS OUR NEW MERCURY.

LINCOLN-MERC'S SHIPPING A LOT OF PARTS TO L.A. LATELY.
HAVEN'T YOU SEEN THE NEW 53'S? THEY'RE ROLLING OFF THE LINE OUT THERE LIKE CRAZY!

Write for "THE AIR FREIGHT WAY TO LOWER COSTS AND BETTER SERVICE"
FLYING TIGERS ANOTHER BUSINESS BUILT ON 'CAN DO'
The Flying Tiger Line Inc.

OFFICES IN PRINCIPAL CITIES · GENERAL OFFICES: LOCKHEED AIR TERMINAL, BURBANK 8, CALIFORNIA · CABLE: FLYTIGER

NEW AVIATION PRODUCTS

Clutch Adjusts Self

A friction clutch now being used in target drone gyros is said to be capable of self-adjustment for both wear and expansion.

Made by Summers Gyroscope Co., the unit is designed to replace conventional electromagnetic clutches. It also reduces maintenance and overhaul requirements of friction types, Summers claims.

Conventional friction clutches often have to be removed for adjustment because of wear and infiltration of foreign matter. With magnetic clutches, difficulty has been encountered in sealing the clutch bearing to prevent the iron powder from entering the bearing race, and vibration can cause the iron to pack and lock the clutch, the company says.

The new clutch follows accepted friction design principles, except that, instead of keying permanently, the armature is threaded to the clutch shaft. Should the clutch facing wear, causing the armature to contact the electromagnet, the armature will stop turning relative to the shaft and wind itself away slightly.

Expansion, on the other hand, requires that the armature be wound back to the electromagnet. This is accomplished by a coil spring connecting the armature and threaded shaft.

But in either case—wear or expansion—a constant gap between the electromagnet and the armature is maintained, providing a fixed input-output ratio for the clutch, Summer says.

Summers Gyroscope Co., 2328 Broadway, Santa Monica, Calif.

Time Totalizer

A Time Totalizer to indicate elapsed intervals with laboratory accuracy for precise timing tasks in aircraft is being marketed by R. W. Cramer Co.

The set is said to be suitable for installation on panels and has a compact

Are space and weight savings vital?

here's how leading aircraft manufacturers get them with NEEDLE BEARINGS

Torrington Needle Bearings are integral design features in many leading aircraft because of their light weight and compactness coupled with their high rated radial capacity.

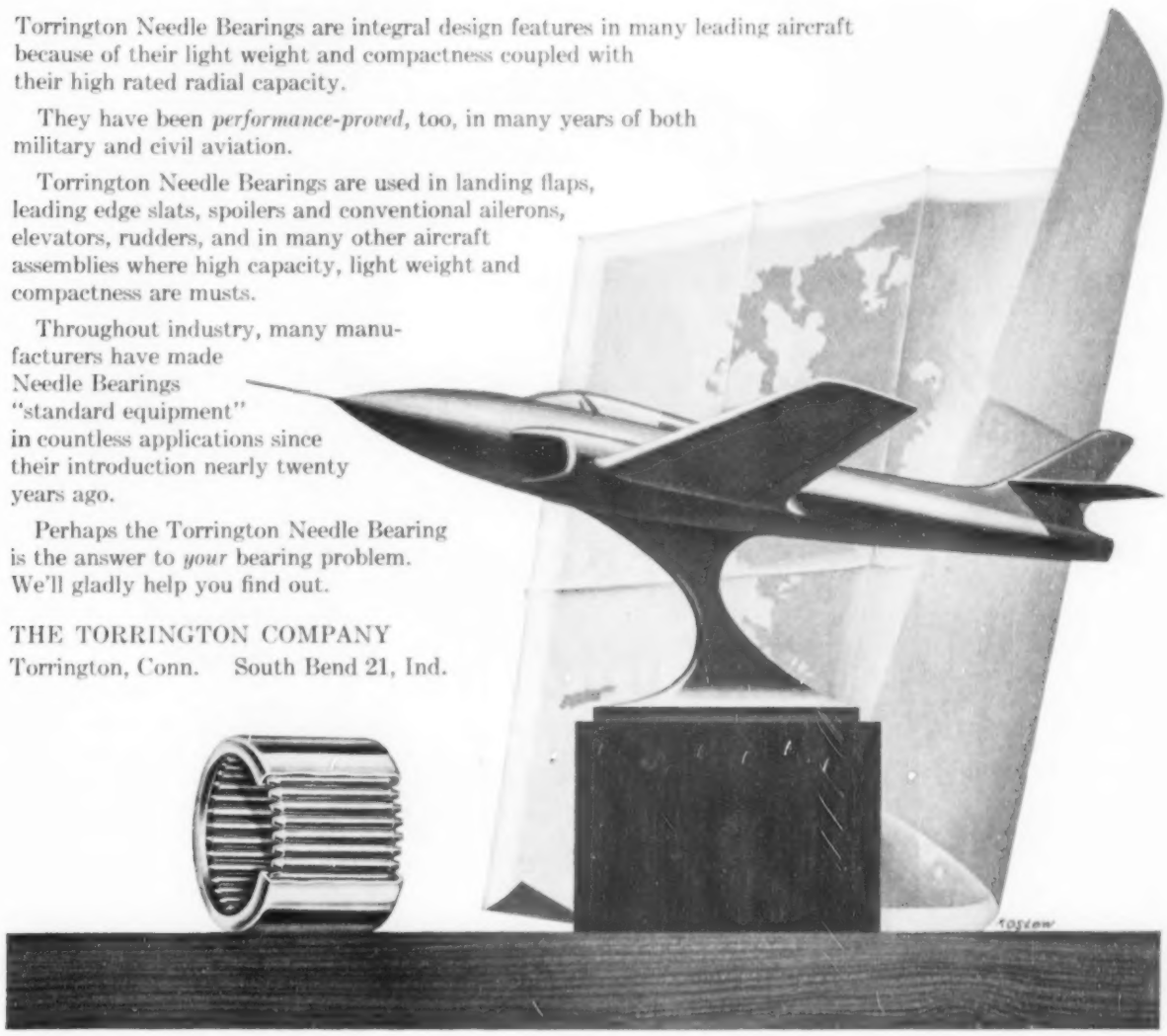
They have been *performance-proved*, too, in many years of both military and civil aviation.

Torrington Needle Bearings are used in landing flaps, leading edge slats, spoilers and conventional ailerons, elevators, rudders, and in many other aircraft assemblies where high capacity, light weight and compactness are musts.

Throughout industry, many manufacturers have made Needle Bearings "standard equipment" in countless applications since their introduction nearly twenty years ago.

Perhaps the Torrington Needle Bearing is the answer to *your* bearing problem. We'll gladly help you find out.

THE TORRINGTON COMPANY
Torrington, Conn. South Bend 21, Ind.



TORRINGTON *NEEDLE* **BEARINGS**

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POPPET TYPE
REDUCER VALVES
Light, compact and inexpensive. 20 variations in production.

LOW RATE
REDUCER-RELIEF VALVES
Incorporate a snubber to prevent overshoot when responding to abrupt changes in flow. 3 variations in production.

Accurate Pressure Control

BENDIX-PACIFIC PRESSURE REDUCING VALVES

REDUCER-RELIEF VALVES
Available in a wide range of outlet pressure settings. Integral snubber.

PRESSURE
CONTROL VALVES
Pressure operated reducer-relief valves in which the controlled pressure is the function of a pressure in another system.

Modern hydraulic systems are becoming increasingly dependent upon the elimination of pressure surges and pump pressure variations. Accurate control of pressure in sub-systems over wide temperature and flow ranges is available with Bendix-Pacific Pressure Reducers. The types illustrated above are in volume production.

Bendix

Pacific Division
Bendix Aviation Corporation
NORTH HOLLYWOOD, CALIF.

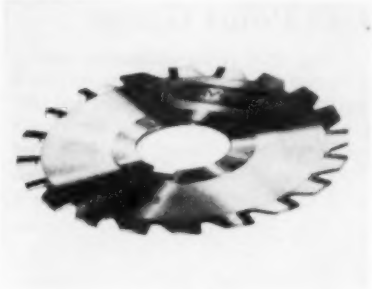
East Coast Office: 475 Fifth Ave., New York 17 • Export Division: Bendix International, 72 Fifth Ave., New York 11 • Canadian Distrib.: Aviation Electric, Ltd., Montreal

meter-type housing. Its accuracy is said to be better than .02 of 1%. A feature stressed by the firm is the Totalizer's positive clutching arrangement, reducing slippage or over-run.

Instead of friction or faceplate clutch, the synchronous-drive motor is permanently connected to the sun gear of a differential system. One of the differential members is connected to the pointer system, while the other goes to a free gear. When the timer is energized, a solenoid-operated pawl stops the free differential member and power is immediately transferred to the pointer differential member.

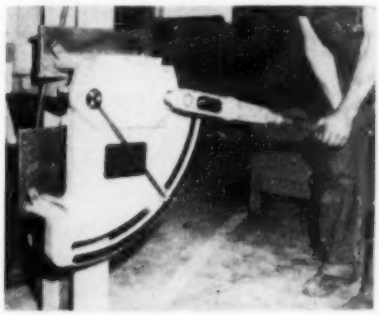
The drive motor has reserve power for operating under adverse conditions and the equipment can be built to meet all requirements set up by military procurement for shock, vibration and temperature, according to a company statement.

R. W. Cramer, Centerbrook 5, Conn.



Long-Life Saws

Long-life, carbide-tipped thin saws are being marketed with contoured (cross-sectionally) tooth forms for cutting slots in various convex forms, including radius and radius with angle tangents. Previously, shorter-life steel cutters were the only ones available for sawing slots in curved forms, according to the producer, Gay-Lee Co., Clawson, Mich.



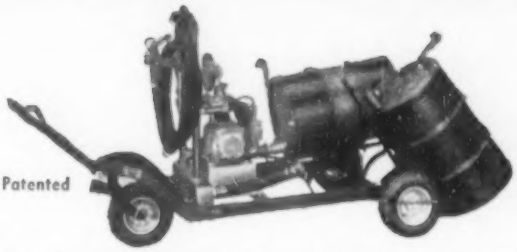
Torque Testers

Two torque tester-trainers, one for heavy-duty torque wrenches, the other for light duty, are beginning to find wide aviation use according to the

Harmeco

HARMAN EQUIPMENT CO. LUBE-A-PLANE LOS ANGELES CALIF.

LUBE-A-PLANE



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Pumps & Meters Oil from Original Barrels to Aircraft

MAXIMUM FLOW AT SUMMER OR WINTER PUMPING TEMPERATURES

Hydraulically engineered; rugged construction throughout; convenient and easy-to-handle. Single attendant loads heavy barrels with lever-operated, self-locking tilter, adjustable to barrels of various heights. This self-locking device also acts as a brake while loading. Electric or gasoline engine types—2, 4 or 6 barrel capacity; hand operated 2 barrel model. When ordering state prevailing range of pumping temperatures.

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Interchangeable! Complete gas engine, electric or hand pump units fit standard trailer.

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maker, B. K. Sweeney Mfg. Co

The testers are designed for wall mounting. The larger checker, Model 71 for heavy-duty wrenches, has a range from 0 to 350 ft. lb., while the smaller, Model 73, ranges from 0 to 1,200 in. lb.

If permanent mounting is not wanted, the Model 73 can be supplied in a portable carrying case. The testers, called Trainer-Testers by the maker, are said to be accurate to within 2% of full scale. They are being used by plane makers, airlines and the Air Force, the firm says.

P K. Sweeney Mfg. Co., Denver, Colo.

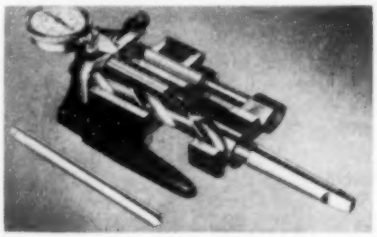
Terminal Cover

A rubber cover for electrical terminal strips in aircraft, which can do away with junction boxes in some applications and generally gives better protection to ordinarily exposed terminals, has been developed by Henry Engineering Co. It may prove a weight-saver, through its elimination of junction boxes.

Several aircraft companies already are making use of the covers, including North American in its F-86 Sabrejets, Henry says. The covers come in lengths desired to cover AN3436 terminal blocks.

The covers are flexible, easily installed or peeled off, yet give a good grip to resist vibration, the maker says.

Henry Engineering Co., 3625 Pacific Ave., Burbank, Calif.



Drill Point Gauge

A new drill point measuring instrument, the Matrix, is claimed to check centrality on twist drill points to .001 in. and angle to within one degree. It is available in two sizes, ¼ to ¾ in. and ¾ to 2½ in. Two vees support straight or tapered drills and readings are made

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tomorrow's aircraft
In the future as well as today, America's aircraft will excel in design, construction...and components. As suppliers to the nation's major airframe manufacturers, Universal keeps pace with today's volume needs, while designing and planning components which will be required for tomorrows' supersonic aircraft.
Being specialists in tool and component design, metal stamping, heliarc and resistance welding and sub assemblies, Universal invites correspondence concerning your company's requirements.

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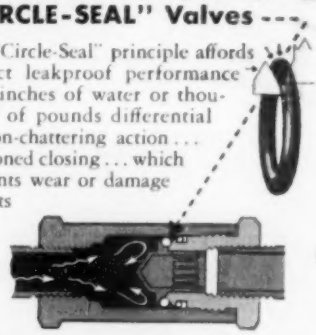
The "Circle-Seal" principle affords perfect leakproof performance with inches of water or thousands of pounds differential ... non-chattering action ... cushioned closing ... which prevents wear or damage to seats



The ultimate answer to check valve requirements from very low pressure to 3,000 psi.

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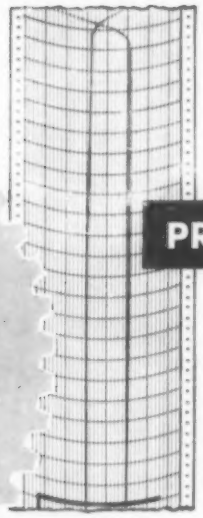
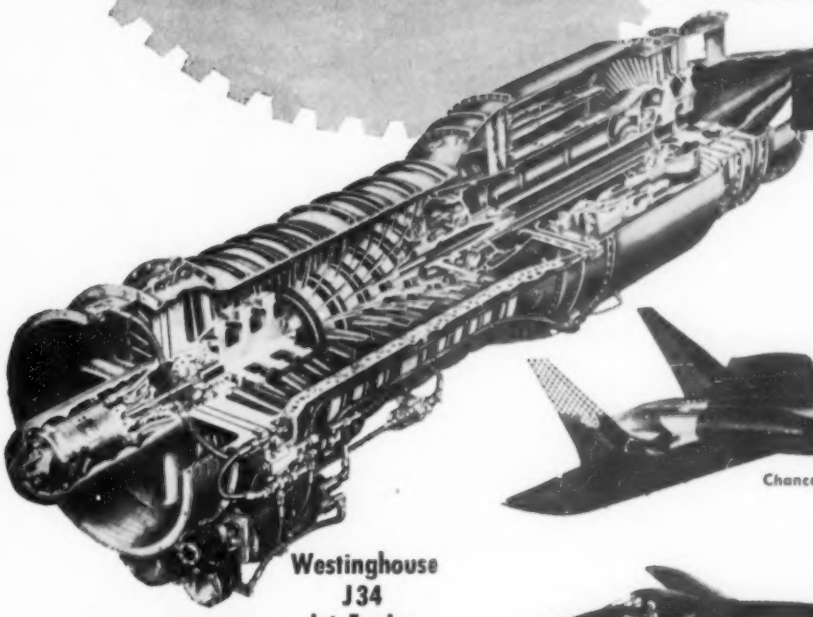


PROVEN BY TEST

The accuracy of Sier-Bath Aircraft Gears is a matter of *record*. To get visible proof that each gear meets the demanding requirements of the aviation industry, Sier-Bath uses gear checking instruments that *chart* accuracies. One type of recording, a "lead" chart, is illustrated.



Westinghouse J34 Jet Engine

PROVEN BY USE

Sier-Bath Precision Gears are used in many of today's aircraft. For example, Sier-Bath supplies gear components for the Westinghouse J34 Jet Engine . . . which powers the Douglas "Skyknight" and the Chance Vought "Cutlass".

Chance Vought F7U "Cutlass"

Douglas F3D "Skyknight"

Sier-Bath PRECISION GEARS

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Will Make **YOUR AIRCRAFT** Perform Better!

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When you purchase Champion Spark Plugs for your aircraft engine or for any other power plant, you are obtaining the world-famed product of a company which devotes all its research, resources and integrity to the production of spark plugs alone.

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

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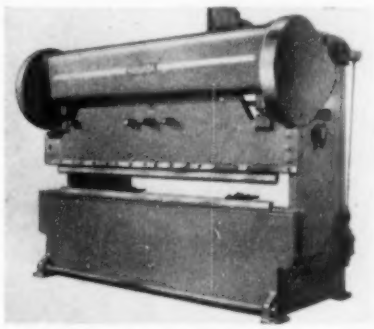
on an ordinary dial. Setting standards are supplied for standard drill point angles for this portable device.

Engis Equipment Co., 431 S. Dearborn St., Chicago 5.



Versatile Brake

An all-steel press brake, produced in 50-, 100- and 150-ton models, can be used for operations that include bending, curling, jogging, corrugating, notching and punching.

Made by Niagara Machine & Tool Works, this new press brake series has self-locking, power-operated ram adjusting screws fitted with micrometer dials to permit duplication of settings for repeat jobs. Clutch and brake can be controlled by foot or by palm buttons on the ram. The ram can be pulled out of accidental stalls by reversing a switch, and it may be tilted under power for tapered work.

Laminated ways are used to reduce wear and assure accurate alignment.

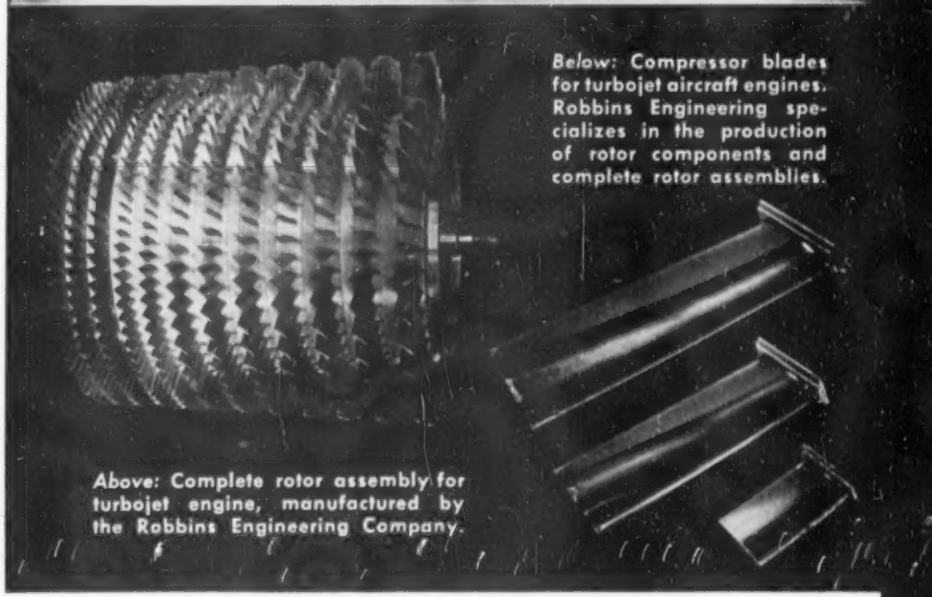
Niagara Machine & Tool Works, Buffalo, N. Y.

Lubrication Pump

A three-element lubricating pump, designed for the new Solar gas turbine engine, provides oil through a combination of one pressure and two scavenge pumps assembled in a single unit, according to the manufacturer.

Oil is furnished to the engine bear-

Jet Compressor Parts



Below: Compressor blades for turbojet aircraft engines. Robbins Engineering specializes in the production of rotor components and complete rotor assemblies.

Above: Complete rotor assembly for turbojet engine, manufactured by the Robbins Engineering Company.

Machined and Assembled to Rigid Specifications

The machining of jet compressor parts and the assembly of complete rotor units require an organization having specialized tooling and inspection equipment and plenty of aircraft know-how. Turbojet engine builders are enthusiastic about the work of the Robbins Engineering Company, a subsidiary of Ex-Cell-O Corporation.

The Robbins organization is cooperating whole-heartedly with the program to build up air power for the defense of our country. All its efforts will be directed toward this end in the present emergency.

ROBBINS ENGINEERING COMPANY
Subsidiary of
EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

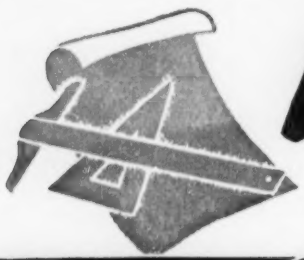
Ease maintenance, speed repairs with **DOT wire harness bands**

Wires can be added or replaced one-handed, without removing the bands. Spring tension prevents accidental opening. Resilient, moisture-proof lining insulates wires, cushions them against chafing. Lining will not pull loose. Illustration shows band with swivel-type attaching clip. Other types available for mounting with rivet, snap-fastener or snap-on clip. Made in 7 standard sizes from 3/16" to 2" diameter.

Monadnock, with a wealth of fastening experience, welcomes inquiries from manufacturers who seek reliable development and production facilities.

MONADNOCK MILLS San Leandro California

subsidiary of UNITED-CARR FASTENER CORP.



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Telling the Market

G.E.C Journey Around the World colorfully depicts British General Electric Co. Ltd.'s numerous applications of electric equipment abroad. Aviation and other industrial uses are shown in this 56-page brochure. Write General Electric Co., Ltd., Magnet House, Kingsway, London, W.C. 2.

Aircraft flareless tube fittings meeting military standards are covered in Bulletin 4120-A1. Given are 17 shapes available in steel, aluminum alloy or stainless steel from 4-in. to 2 in. o.d. Write Parker Appliance Co., 17325 Euclid Ave., Cleveland 12.

Ramp Safety is a visual aid designed to instruct airline employes in accident prevention when using lift trucks, conveyors, cargo trains, as well as the dangers of whirling props, prop blast and refueling. The 18x24-in. pages are spiral bound and can be opened to form an easel. Prices may be obtained by writing National Safety Council, 425 No. Michigan Ave., Chicago, Ill.

Publications Received

- **Rockets Beyond the Earth,** by Martin Caidin, drawings by Fred L. Wolff and Jerry J. Schlamp; published by The McBride Co., 200 E. 37 St., New York 16, N. Y., 1952, $4.50. A story of the influence rocket development will have on our future world.

- **Practical Manual of the E-6B Computer,** by Allan C. Zweng; pub. by Pan American Navigation Service, 12021 Ventura Blvd., N. Hollywood, Calif., 1952, $3.00.

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RESEARCH – What is the Research budget? What are the chief areas of Research? What is the trend of expenditures? What new facilities are needed? The 1953 "Inventory of Air Power" issue will examine Aeronautical Research and report on these questions.

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Crash Tests

- **NACA sets sights on crash-safe aircraft.**
- **Simulates accidents to study fires, structure.**

Aircraft manufacturers and operators are awaiting results from a continuing series of crash tests conducted by National Advisory Committee for Aeronautics to develop more crash-resistant structure and eliminate fires in plane disasters.

So far only a small group within the industry and airlines is being permitted to see the details, which are being withheld from general release due to "military classification." This is despite widespread benefit to world aviation that would result from dissemination of lessons learned during the tests.

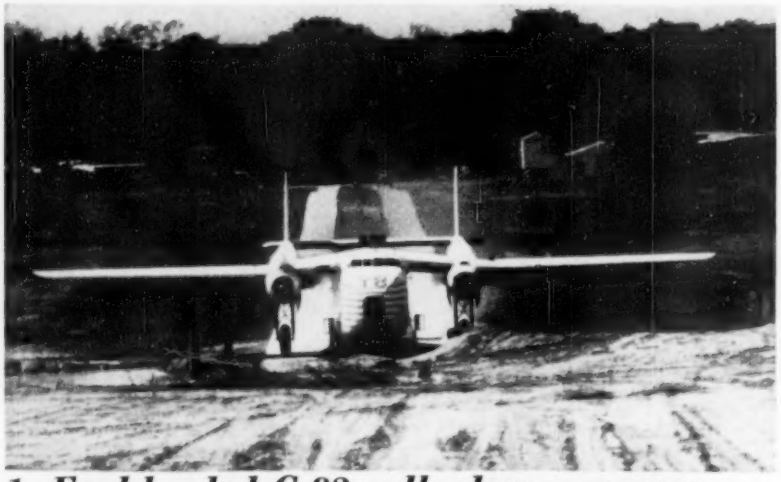
▶ **First Tests**—First two series of crash-fire tests were conducted at the Army's Ravenna, Ohio, arsenal with obsolete Curtiss C-46 and Fairchild C-82 Packet cargo transports. The planes were provided by the Air Force after an NACA research panel said no other technique than actual full-scale crashes would provide the needed information.

The tests simulated takeoff accidents in which the airplane fails to become airborne, shears off propellers and landing gear, ruptures its fuel tanks and skids along the ground to a stop. This type of crash was considered to have a maximum of potential ignition hazards, including broken fuel and oil lines within nacelles.

To create the crash unmanned planes were loaded with more than 1,000 gal. of fuel, and started down a 1,700-ft. runway with engines at full throttle. A monorail onto which the planes were hooked kept the aircraft centered on the runway until impact. Detailed photographic record was made by high-speed motion picture cameras at seven points. Inside each plane was a fireproof, shock-resistant case of instruments that measured temperatures, etc.

Studies were made of means by which lubricating oil or hydraulic fluid could be ignited and spread into a gas fire.

One observation was that cutting engine ignition switches before flow of fuel stops sometimes results in fires when fuel passes through the engines and is ignited by hot metal at exhaust pipes.—AMcS.

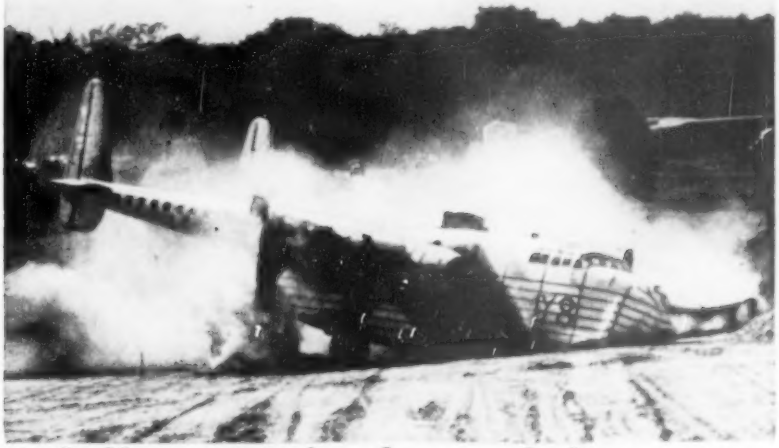


1. Fuel-loaded C-82 rolls down runway . . .

2. Runs into NACA crash embankment . . .

3. Starts swing into a ground loop . . .

4. Plane skids around, dragging its wing . . .



5. Suffers extensive damage before . . .

6. Oil and fuel hit hot metal, start fire.

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CAB Okays NWA Stratocruiser Subsidy

- **Northwest 'tentatively' gets high mail rate, but Board decision indicates other carriers may be turned down.**
- **New data on B-377 operation is expected at upcoming hearing on Pan American-TWA trans-Atlantic case.**

By Lee Moore

Civil Aeronautics Board "tentatively" has decided to pay an extra subsidy on Northwest Airlines' Stratocruiser operation of international routes. But the Board may refuse to grant such subsidies to other Stratocruiser operators and later may stop underwriting Northwest's costs.

This is the meaning of CAB's carefully worded decision setting final mail rates for Northwest's Alaskan and trans-Pacific routes. The Board opinion says CAB will study the Stratocruiser problem more thoroughly in Pan American's Atlantic mail-rate case.

"There is no question that the B-377 (Boeing Stratocruiser) has been a more expensive aircraft to operate in comparison with other postwar aircraft," the Board says.

▶**Northwest Mail Rate**—The Board awarded $16 million of final mail pay to Northwest for four and a half years of past Alaskan and trans-Pacific operations. CAB also set a future rate of 2.52 cents per seat-mile—estimated to yield the carrier $5.75 million a year, retroactive to last May 1.

Of the new $5.75-million annual mail pay, the Board considers $4,714,850 as subsidy and the remaining $1,035,350 as compensation for mail service actually performed.

The $16-million back pay does not include 1951, because the Board and Northwest have not yet reached an understanding for that year. The estimated $16 million for past operations breaks down to $14,224,000 for Sept. 26, 1946, through Dec. 31, 1950, and $1,824,000 for Jan. 1 through Apr. 30, 1952. The latter four-month payment averages 2.71 cents per seat-mile flown by Northwest. The new rate, effective since last May 1, is 2.52 cents a seat-mile.

For the 1946-50 period, Northwest must refund $645,000 to the government. But the carrier gets back all but $90,000 of the sum, because Northwest receives $555,000 more than the temporary rate yielded in the January-April period of 1952.

Final current and future rate—estimated to yield $5.75 million a year—is the same rate proposed in CAB's show-cause order of last April.

All in all, Northwest's 1952 annual report should reflect pre-tax earnings just $90,000 less than the operating income anticipated before other adjustments.

▶**Rates Challenged**—Because of a challenge of CAB-proposed rates by a nonscheduled Seattle-Alaska airline, Air Transport Associates, the Board opinion gives detailed justification for the rates.

Amos Heacock, president of Air Transport, alleged that Northwest used its subsidy advantage to compete with the nonsked at coach rates below Northwest's cost of the operation. CAB analyzed the Northwest coach results and found they increased revenue by about $200,000 a year.

"The fact remains that ATA failed to submit any substantial evidence to sustain its case," the Board concludes.

Another ATA allegation said the high cost of Northwest's Stratocruiser operation did not justify subsidization. But the Board decided the charge had no bearing on Air Transport's claim of unfair competition.

"We do, however, on our own in-

CAB Policy on Stratocruiser

Here is what CAB has to say on the question of whether the government should pay the extra cost of Stratocruiser operation on subsidized routes:

"There is no question that the B-377 has been a more expensive aircraft to operate in comparison with other postwar aircraft.

"One charged with administering a broad developmental statute such as our own cannot, however, stop there. High costs have been a concomitant of practically all new aircraft types upon their introduction. In the main, however, they turned out to be a boon to the industry and the public; for within a reasonable time many difficulties were mastered with consequent decreases in costs of operation, and the greater revenue potential was realized. Had we been too quick to judge, much of the development of the industry through the introduction of new aircraft types would have been lost.

"Despite the considerable time that the B-377 has been in operation without attaining the costs and revenues hoped for, we are not yet prepared to condemn it for all carriers and under all circumstances.

"We are proceeding cautiously on a case-to-case basis, and then only experimentally. There is now in progress a comprehensive mail-rate proceeding involving Pan American and TWA in which the operation of the B-377 by Pan American is a dominant issue. We hope that we shall know much more about this problem at the conclusion of that proceeding.

"The Board has not underwritten this aircraft for any carrier on anything like an overall or general basis; nor does it propose to do so in this proceeding.

"While it might appear from the overall size and the nature of operations of a carrier that it could prudently employ several B-377s, that is not enough for the purpose of underwriting such aircraft with mail pay. The underwriting must be predicated upon the attainment of optimum costs and revenues and must serve the developmental purposes of the act.

"This requires a segment-by-segment evaluation of the entire system of a carrier, which was done in this instance and which resulted in the recognition of the B-377 for mail-pay purposes to the extent that it meets certain cost and revenue-producing standards.

"For the particular segment in issue here, the underwriting is limited to approximately 1.5 B-377s to be used in making six roundtrips per week—two of these roundtrips being in connection with through-service to the Orient.

"We shall keep a close watch on the results obtained and will initiate a new mail-rate proceeding at the first definite sign of a needed adjustment with respect to the employment of this aircraft type."

itiative wish to elaborate a little on our tentative findings accompanying the outstanding show-cause orders," CAB says.

The Board opinion devotes two pages to the Stratocruiser problem.

▶ **Subsidizing Stratocruisers**—CAB members made unanimous their statement "tentatively" justifying subsidy underwriting of the Stratocruiser operation. Here is how they unofficially interpret the decision:

• **Depends on plane use.** The Board emphasizes that its decisions on underwriting Stratocruiser cost will be individually applied to each separate case.

• **More time.** The Board also says it is not ready to condemn Stratocruiser economy, which has not improved as much or as fast as other aircraft.

• **Stratocruiser competition.** Even if the cost of operating a Stratocruiser continues to be uneconomical, the subsidy issue depends on the wisdom of management judgment in buying the plane and continuing to operate it—not on whether the aircraft turned out to be a disappointment.

Whether the Board will "underwrite" fully extra cost for each airline that bought the Stratocruiser depends on whether carriers exercised reasonably "honest, economical, and efficient management" in purchase and operation of the craft.

Key sentence in the Northwest mail-rate decision on CAB policy in this matter is: "The underwriting must be predicated upon the attainment of optimum costs and revenues and must serve the developmental purposes of the act." The Board points out that other new planes have been costly at first but have turned out to be economical after a break-in period.

The Civil Aeronautics Act provides subsidy partly for the purpose of developing new, improved equipment. The Board opinion therefore says CAB is "not yet prepared to condemn it (the Stratocruiser) for all carriers and under all circumstances."

▶ **Pan American Case**—The Board opinion in the Northwest mail-rate case says the trans-Atlantic mail-rate case involving Pan American and Trans World Airlines will reveal more data with which to evaluate the Stratocruiser problem.

In this case, Pan American asks a higher mail and subsidy rate than TWA on the North Atlantic. Part of Pan American's claim is based on the higher cost of its Stratocruisers in competition with TWA Constellations.

Both TWA and Pan American will get final mail rates in the proceeding this year. One TWA claim against Pan American's appeal for higher mail pay to cover Stratocruiser costs reportedly will be that the TWA management did not make the mistake of buying Stratocruisers, and therefore Pan American should not be compensated at a higher rate than TWA for the same service.

However, the Stratocruiser cost is only one of a number of issues in the case. Pan American also points to other factors causing higher costs than TWA has, including lower route density, more foreign stations to support, more competition with foreign carriers, and lack of a lucrative domestic route like TWA's to spread overhead and facilitate international sales promotion.

Air Cargo Boom Forecast by CAA

Air cargo will triple its present volume by 1960 and two-thirds of it will move in all-cargo planes, according to a Civil Aeronautics Administration study to be printed this week. Domestic airfreight and express business will grow from an estimated 250 million ton-miles in 1952 to 400 million by 1955 and 700 million by 1960, CAA predicts.

Cargo development will increase rapidly later in the decade when passenger airlines have caught up with public demand for more lucrative aircoach business. Right now, airlines get only 20 cents a ton-mile for airfreight. Their yield from aircoach is 40 to 45 cents a ton-mile, and passengers cost less to load.

The CAA prediction is a compromise between the Air Transport Assn.'s recent estimate of less than double present volume and forecasts by West Coast aircraft manufacturers Douglas and Lockheed of a five- to six-fold increase.

CAA made the study in an attempt to measure airport cargo-handling facilities that will be needed. The administration started with a projection of the current healthy growth trend; then it appraised the major factors likely to influence that trend.

▶ **Major Findings**—The study reports:

• **Same aircraft types** still will be hauling cargo late in the decade, so there won't be much change in direct flight cost.

• **Rates won't decline** much from the present level, relative to surface transport; therefore, manufacturer forecasts are optimistic.

• **Increased delivery speed** will result from improved ground-handling techniques and facilities, allowing better service by carriers.

• **Excess aircraft capacity** after 1954 will prompt more freight development.

▶ **Cargo Planes**—CAA has estimated that about two-thirds of domestic cargo will move exclusively in cargo planes by 1960—almost all by Curtiss C-46, Douglas DC-4, Douglas DC-6A and Lockheed 1049B.

A brief look at the current crop of military assault planes—Lockheed XC-130, Chase C-123 and Fairchild C-119 series—gave CAA the impression their specialized design has so compromised aerodynamic efficiency that the aircraft will not offer lower costs than today's commercial planes.

Few surplus Douglas C-124 Globemasters are expected to be available for commercial use much before 1960, CAA says. Toward the end of the decade, CAA figures the DC-6A and L-1049B will replace the obsolescent C-46 and DC-4 as the backbone of commercial cargo fleets.

Passenger-plane flight of freight will continue to expand but not as fast as all-cargo service. One reason for this noted by CAA is that major demand for freight service is overnight; most passenger planes operate during daylight hours.

The study does not discount the importance of combination passenger-cargo service. Some passenger DC-6Bs already in service have cargo capacity almost equal to that of a C-46 freight

Freight Forecast

(Domestic ton-miles)

1951	245,500,000*
1952	254,188,642†
1955	400,000,000
1960	700,000,000‡

(Includes freight and express but not mail).

* CAA figure. ATA computes domestic trunk, local, and all-cargo lines' 1951 volume of freight and express at 248,567,431 ton-miles.

† ATA estimate.

‡ CAA estimates a spread of 600 to 800 million ton-miles, with 700 million as the working figure for statistics.

Air Cargo Predictions for 1960

	(Domestic ton-miles)	% increase from 1952
Air Transport Assn.	370,585,300	45
Civil Aeronautics Administration	700,000,000	175
Douglas Aircraft study	1,350,000,000	430
Lockheed Aircraft study	1,500,000,000	490

transport. American Airlines' DC-6Bs have a cargo capacity of 8,000 lb., two-thirds that of the C-46. Because DC-6 speed is considerably faster than the C-46, its effective cargo capacity is about the same.

► **Airport Cargo-Handling**—The CAA study concludes that airport and airways facilities can absorb the rapid growth of all-cargo service without difficulty.

The major demand for cargo movement is between the close of business at night and the opening of business the following day. Thus, the bulk of air-cargo flights may move at night after most passenger planes are bedded down, relieving congestion of airport and airways facilities.

The biggest problem of air-cargo business today is loading. CAA finds the adjustable loading dock a major solution to this problem, as reported in AVIATION WEEK (Dec. 8, p. 88).

Copters Haul Cargo Between Airports

New York Airways last week started offering helicopter trans-shipment of air-freight for the scheduled airlines serving New York's three major airports, under a contract signed by Air Cargo, Inc.

Although the cost is substantially higher than surface trucking, it can save precious hours and possibly even a day on connections between some flights. Copter time from Newark to Idlewild is 18 minutes, compared with four hours for the truck service that airlines have been using.

The contract between New York Airways and Air Cargo, Inc., (on behalf of member airlines) became effective Jan. 19 and NYA expects to inaugurate the new service about Jan. 26. The fixed-wing carriers will pay New York Airways $1.50 per hundred pounds for hauling freight between the metropolitan New York air terminals with a minimum charge of $1.50. Comparative contract rate by surface carrier is approximately 55 cents per hundred pounds with minimum charge being approximately 55 cents. The airlines will absorb the difference in surface and helicopter transport rates.

Since New York Airways is certificated to carry mail, its cargo service will be on a space-available basis and the carriers probably will use the service to take care of emergency shipments. NYA's Sikorsky S-55s have a payload of about 1,200 lb. each. Indications are that the copter carrier plans to get in the freight business on a large scale later. At present, Air Cargo's surface traffic from the Idlewild, La Guardia and Newark airports handles roughly 400,000 lb. monthly.

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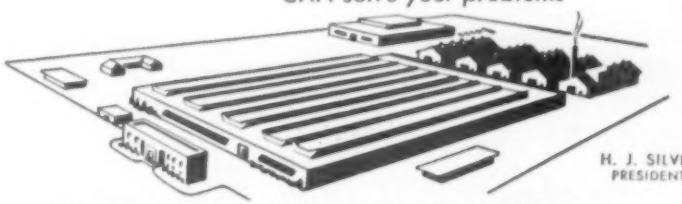

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1951-1952 Air Traffic
Metropolitan New York Area

Idlewild, La Guardia, Newark, Teterboro Airports

	1952	1951	% Change
Scheduled Passengers			
Domestic	5,742,214	5,587,495	+2.8
Overseas	845,053	678,988	+24.5
Total	**6,587,267**	**6,266,483**	**+5.1**
Scheduled Mail, lb.			
Domestic	43,851,230	36,403,786	+20.5
Overseas	11,881,481	10,346,437	+14.8
Total	**55,732,711**	**46,750,223**	**+19.2**
Scheduled Cargo, lb.			
Domestic	182,600,160	182,327,251	+0.1
Overseas	35,822,436	27,993,676	+28.0
Total	**218,422,596**	**210,320,927**	**+3.9**
Scheduled Plane Movements			
Domestic	235,208	228,057	+3.1
Overseas	32,635	25,264	+29.2
Total	**267,843**	**253,321**	**+5.7**
All Other Plane Movements	248,550*	264,271*	−5.9
Total Plane Movements	**516,393***	**517,592***	**−0.2**

** Figures include Teterboro plane movements as reported by CAA.*
NOTE: Nonscheduled and contract carriers accounted for 255,272 passengers and 10,847,274 lb. of cargo during 1952.
SOURCE: Port of New York Authority.

N.Y. Air Traffic Exceeds Target

Air traffic in the metropolitan area during 1952 broke all previous records—in fact, it attained a level not expected to be achieved until 1960, according to the operator of the area's big air terminals, Port of New York Authority.

PNYA's regional airport system last year handled 516,393 plane movements, 6,587,267 passengers, 218,422,596 lb. of cargo and 55,732,711 lb. of mail at Idlewild and La Guardia Airports in New York, and Newark and Teterboro Airports in New Jersey. The new records (see table) were set despite the fact that one of the busiest fields, Newark, was closed down the greater part of last year (from February through November) following several bad crashes early in 1952.

► **Facilities Expansion**—PNYA intends to step up facilities at the four fields to take advantage of the boom in air business. Its 1953 budget calls for expenditures of $30,207,700 with the biggest slice, $20,681,400, going to the Idlewild terminal. Newark Airport gets the next biggest allowance, $8,006,000. Teterboro will be third with $1,384,000 earmarked for 1953 and La Guardia Airport's improvements will reach a total of $136,100.

By the end of 1952, Port of New York Authority had invested approximately $90 million in the four airports and in addition the City of New York, the City of Newark and the federal government have expended $120,919,000 on the three major terminals.

It is believed that this total investment of more than $210 million will probably be expanded by an additional $160 million to keep the airports abreast of air transport growth.

► **Local Benefits**—Among direct community benefits from the fields, employment and payroll-wise, PNYA cites that last year, in Queens, at New York International and La Guardia Airports, there were 15,535 jobs having a total payroll of more than $76 million annually. By 1965 these jobs are expected to climb to 36,000 with a payroll of $160 million.

Newark Airport brings the job total to 16,414 with payroll of $80 million annually. In 1956 all three airports will employ 42,000 and have annual payrolls totaling $190 million.

► **Highlights**—Statistical highlights of operations at the four airfields in 1952:

- **Idlewild** handled 105,205 plane movements and 2,324,214 scheduled passengers, 95,542,805 lb. of scheduled air cargo and 19,322,115 lb. of airmail. Total plane movements were up 205.7% over 1951; passengers up 203.6%, mail up 96% and cargo up 242.9%.
- **La Guardia** handled 175,622 planes movements in 1952, up 1.3%; 3,999,875 scheduled passengers, down 6.5%; 34,868,281 lb. mail, up 14.8%; 100,964,839 lb., up 26.5%.
- **Newark** handled only 27,164 plane movements last year, 72.9% less than in 1951 and all its other statistics were

on the minus side. Passengers last year totaled 260,166, 78.7% less than 1951; mail came to 1,526,398 lb., down 76.6%; scheduled cargo totaled 17,784,294 lb., down 82.7%.

• **Teterboro** last year handled a total of 3,012 passengers, 15,917 lb. of mail, 4,130,658 lb. of cargo and marked up 198,402 plane movements.

CAB May Decide Pacific Case This Year

The Trans-Pacific Route Case should be decided by Civil Aeronautics Board this year, according to CAB examiner Thomas L. Wrenn. In this case, Northwest, Pan American, TWA and several nonscheduled airlines are fighting for prize routes stretching half way around the world—from the U. S. to the Orient and India.

Examiner Wrenn's estimate of possible case completion this year assumes that the Board will deny motions of Pan American and others to consolidate the Alaska service and Hawaiian route cases with the trans-Pacific case. Board decision on this issue is expected to be made soon.

The staff is recommending that the cases be kept separate, as originally decided by the Board.

Here is how the trans-Pacific, Hawaiian and Alaska service cases line up at present:

• **Trans-Pacific applicants.** Northwest and Pan American seek renewal of their present temporary trans-Pacific certificates, with some amendment. TWA and Northwest have also submitted rival applications to supplement or replace Pan American service from India to Tokyo. In addition, non-certificated airlines applying for trans-Pacific certification include Air Transport Associates, Transocean, Overseas National, Pacific Overseas, Central Pacific and South Pacific.

• **Hawaiian route case.** Applicants include Pan American, Northwest and United, plus the same nonskeds that have trans-Pacific applications in the works.

• **Alaska service case.** Certificated Seattle-Alaska carriers are Alaska Airlines, Northwest, Pan American, Pacific Northern, plus Wein, Totem, Sourdough, Air Transport Associates, Northern Consolidated, Golden North, General Airways, Arctic Pacific and Air Cargo Express.

If the Board keeps these three cases separate, examiner Wrenn expects to transfer the Alaska case and perhaps give the Hawaiian case to another examiner.

Deadlines for exhibits will be set up immediately following CAB ruling for or against the motions to consolidate the cases.

ACTA Appoints Prill Technical Director

Air Coach Transport Assn. has appointed George C. Prill as its first technical director—to professionalize its relations with Civil Aeronautics Board and Civil Aeronautics Administration and to improve technical service to its member carriers.

Prill has been with the CAB Safety Regulation Bureau the last two years; was with International Air Transport Assn. the previous four years, and had been associated with Pan American, TWA and Douglas Aircraft.

ACTA thus has taken another step toward establishing its reputation as a full-time, full-fledged industry association.

ACTA had only a hotel room and a 27-cent bank account when it started two years ago. It now operates 50-60 field offices procuring military business for its members. The organization's budget is estimated at $75,000 a month in commissions on about $1 million in business procured.

The association's next most important function is safety. The major project is participation in the C-46 operator's joint program to engineer the C-46 up to modern "transport category" safety standards at a gross weight

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of 48,000 lb. This extensive program is underway at American Airmotive, Miami, Fla.; estimated cost per plane for the complete job may be around $120,000.

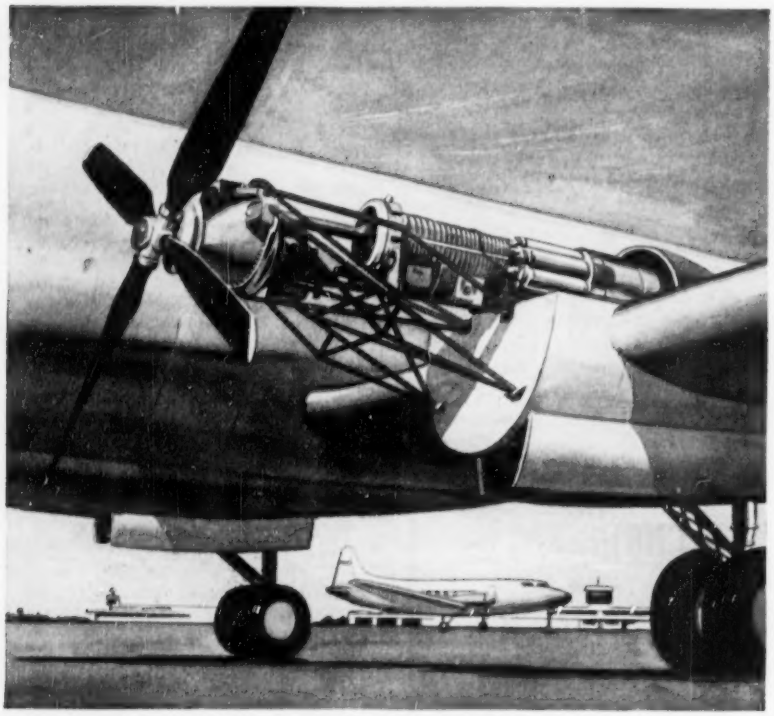
U. S., Philippines Seek Air Agreement

Resumed negotiations of State Department and Civil Aeronautics Board with the Philippines dragged on into last week with expectation of some solution soon, but none that would satisfy both sides. Philippine Air Lines seeks a direct Tokyo-San Francisco route.

American carriers Pan American and Northwest already face new competition from a Japanese airline on that route and do not want to see the Pacific turn into another super-competitive situation such as exists over the Atlantic.

The Philippines argue that both Pan American and Northwest have trans-Pacific routes serving both Tokyo and Manila direct. Therefore, they argue that they at least should have the right to serve Tokyo en route to the U. S.

Compromise proposals include adding Los Angeles or Seattle to PAL's present route. But more than one U. S. line is bitterly opposed to granting Los Angeles-Honolulu service to Philippine.



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Silver City Gets Libyan Concession

Silver City Airways, British freight and passenger operator, has received a concession from the Libyan government to operate second- and third-class passenger and cargo service on internal routes within Libya.

It will use Bristol 170 Freighters fitted to take nine second-class passengers in a separate cabin in the rear of the fuselage, 20 third-class passengers in the middle and 6,000 lb. of freight in the forward hold. Cargo will include vehicles, livestock and freight.

The new service's main purpose is to develop the 416-mi. direct route between Tripoli and Benghazi, a two-hour flight. By bus the distance is 660 mi. and takes 36 hr. Initially, Silver City plans daily service between Tripoli and Benghazi and weekly services from these points to Sebha and Kufra oasis. It is expected that operations can be extended later to Tunis, Malta and Egypt and that Meccan pilgrims may be carried.

PAA to Reduce Venezuela Service

(McGraw-Hill World News)

Caracas, Venezuela—Pan American World Airways will suspend operations at two of five airports the airline serves in this country because of a proposed United States-Venezuela air pact that would force PAA to "sacrifice some of its rights."

Arrigo Righi, PAA manager here, says Pan American now is discussing the reduction of service with the Venezuelan government but that the airline definitely will move out of two undetermined areas.

Pan American operates at Maracaibo, Coro, Maiquetia (Caracas), Barcelona and Maturin airports under 1943 and 1950 contracts with Venezuela.

New Hangar for Avianca

(McGraw-Hill World News)

Barranquilla—A hangar 190 ft. in span and 223 ft. in length has been erected by Aerovias Nacionales de Colombia (Avianca) at Soledad to improve its maintenance facilities. The new structure will also serve the three Super Constellations the Colombian carrier has on order.

Structure is of compressed wood, vapor-treated and immunized against insects. The hangar includes facilities for engine overhaul, electrical accessory work, hydraulic bench, instrument workshop, and spares storage. Cost of the project is estimated at $400,000.

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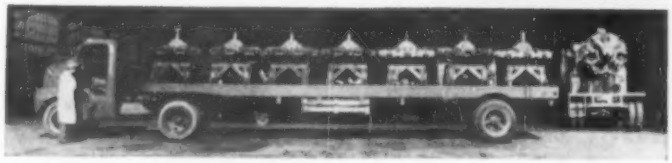

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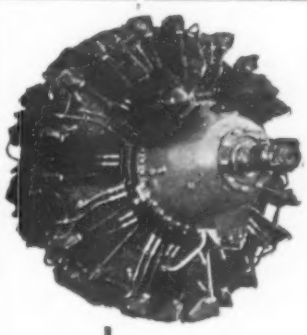

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Quantity	Part No.	Mfg.	Description
90	36001-0	Eclipse	Compass
11	14601-1F-B1	Eclipse	Gyro Indicator
71	828TY13Z2	Weston	Oil Temp Indicator
40	119862	Weston	Carb. Air Temp Indicator
10	15401-1	Eclipse	Amplifier (PB10)w/ED3 MOUNT
66	10078-1AG	Eclipse	Gyro Indicator
62	CQ-9	Eclipse	Clutch Switch (PB10)
57	MF45-3911-90Z	Vickers	Hydraulic Pump (3000PSI)
387	PF4-713-90BCE	Vickers	Hydraulic Pump
75	1416-19E	Eclipse	Starter
142	28008	Airesearch	Jack (Cowl FLAP)
45	AN4103-2	Clifford	Brass (Valve #U4785) Oil Cooler
120	MF9-713-15A	Vickers	Hydraulic Pump
550	TFD 8600	Thompson	Fuel Booster Pump
125	D7818	Adel	Anti-Ice Pump
250	AN4014	Erie Mater	Wobble (D-3) Pump
1000	AN5780-2	G.E.	Wheel & Flap Position Indicator
400	AN5780-2	Weston	Wheel & Flap Position Indicator
115	P4CA2A	Parker	Primer
70	AN3213-1	Scintilla	Ignition Switch
450	A-9 (94-32226)	Nasco	Ignition Switch
90	JH950-R	Jack & Heinz	Starter Motor
53	AN6203-3	Bendix	Accumulator 10"-1500 P.S.I.
140	K14949E	Marquette	Windshield Wiper Kit
188	EYLC-2334	Barber-Colman	Control
11	12086-1C	Eclipse	Amplifier
250	558-1A	Eclipse	Oil Separator
100	716-3A	Eclipse	Generator (NEA-3A)
89	318	Edwards	Horn
230	921-B	Stewart-Warner	Heater (200000 BTU)
97	6041H-146A	Cutler Hammer	Relay (B-12)
22	0655-D	Aro	Oxygen Regulator
65	ASDC2	CO_2 Mfg. Co	Fire Detector
384	564-2A	Eclipse	Oil Separator

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Quantity	Part No.	Description
166	1045	Bearing
500	3506	Flange
130	8288	Follower Ass'y
814	35814	Blower Ass'y
53	48362	Shaft
75	48363	Shaft
56	48392	Sump
390	48461	Gear
78	76236	Gear
1178	84289	Bearing
113	84487	Housing
77	84591C	Nose Housing
200	48350-D	Crankcase Ass'y
200	84083	Cylinder
100	84084	Cylinder
200	84085	Cylinder

43 PIECES ENGINE QUICK CHANGE UNITS Applicable to GRUMMAN FM-1 AIRCRAFT. COMPLETE with ACCESSORIES

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Quantity	Part No.	Description
247	PD12K10	Stromberg Injection Carburetor
19	1375F	Holley carburetor
407	SF9LN-2 (manufacturer's part No. 10-12453-6 Spec. AN9511)	Bendix Scintilla Magneto
42	SF5RN-12 (manufacturer's part No. 10-26170-1)	Bendix Scintilla Magneto
185,000	L54AD1	Spark Plug (Aero)

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328	PD12K10	Stromberg Injection carburetor
236	PR48-A1	Stromberg carburetor

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SHORTLINES

► **American Airlines** airfreight volume in 1952 set a record of 46,898,000 ton-miles—up 26% over 1951. December's 5,003,242 ton-miles topped 5 million for the first time in the scheduled passenger airline industry. Figures exclude American's six DC-4s on the Pacific airlift. Air express of 9,938,113 ton-miles gained 11% over 1951.

► **British Overseas Airways Corp.** notes increase in New York-Bermuda business in November-December, 1952 over same period in 1951 despite 21 fewer flights last year. Comparative load factors: 1952, 54.2%; 1951, 46.5%.

► **California Central Airlines** is experimenting with an instrument approach cockpit procedure improvement devised by chief pilot C. L. Stout. An interruption switch on the pilot's control wheel allows him to turn off the squeal of the fan markers to prevent drowning out ground control instructions. Pressing the button on the wheel is more convenient than reaching to the regular toggle switch on the control panel, pilots say.

► **Civil Aeronautics Board** examiner F. M. Ruhlen recommends in the Portland-Seattle service case that CAB certificate Northwest to fly between Portland-Spokane, and Western to serve Portland and Seattle on all flights instead of to and from California only.

► **Civil Aeronautics Administration** diverted $2.5 million from airways establishment funds to rush reconstruction of typhoon-wrecked facilities at Wake Island. CAA is asking a supplemental appropriation to replace the airways funds before end of this fiscal year.

► **House of Representatives** bills introduced so far include: free transport for "ministers of religion" (airlines would oppose because of revenue loss, plus discrimination against other types of passengers); require complete list of passengers together with a list of those to be notified in case of accident (airlines would oppose because of cost, time loss, frightening of customers, and the fact railroads and other forms of transportation are not required to do so); 50% rate reduction on airmail parcel post to armed forces overseas (airlines would favor because of resultant increased volume).

► **International Air Transport Assn.** technical subcommittee studying turbine fuels will report its findings in April. Chairman is TCA engineering director J. R. Dyment.

► **Pan American World Airways** reports its 1952 passenger traffic through the Miami gateway gained 7% to 312,572, and cargo gained 21% to 25.5 million pounds. . . . Company is cutting Tokyo-Honolulu time from 18 hr. to as low as 11 hr. by using the west-east jet air stream at altitudes from 18,000 to 25,000 ft. during the winter months.

► **Sabena Belgian Airlines** is slated to receive two of its eight DC-6Bs on order, plus two DC-6As, this spring. Company has acquired a third Bell 47 helicopter for its mail circuit in Europe.

► **Seaboard & Western Airlines** president Raymond A. Norden predicts that total 1953 trans-Atlantic airfreight volume will gain 25% over last year to 58 million ton-miles. He bases the prediction on an expanding volume of U. S. imports from Europe by air.

► **Swissair** is distributing in New York latest snowfall reports and skiing conditions prevailing in all important Swiss ski areas. Reports arrive on each Swissair flight from Zurich and are posted following day at the Swiss Center, 10 W. 49th St., New York.

► **Transocean Air Lines** has been denied CAB exemption to fly refugees from Paris to New York because contract price was "very little" different than that offered by Pan American, which is certificated to fly passengers on the route. CAB policy generally calls for denial of special exemptions to non-authorized carriers where substantially similar terms are offered by an authorized carrier. Transocean is authorized to carry freight, not passengers, across the Atlantic, but the Board has granted special exemptions for passenger flights under special circumstances.

► **Trans World Airlines** has retired its last DC-3.

► **United Air Lines** plans to start coach service to Honolulu May 1 with 70-seat DC-6s. Nonskeds have been flying coach on that route for some time, and Pan American started this winter with 80-seat Stratocruisers. United later plans to introduce DC-6 coach on its transcontinental route, now served by DC-4s. No plans are announced for DC-6 replacement of DC-4s on the West Coast route. . . . Company reports December passenger-miles gained 17% over a year ago to 181,318,000, and cargo gained 47% to 3,716,000 ton-miles. . . . UAL has cut freight rates 12% on volume shipments of clothing from west to east.

WHO'S WHERE

(Continued from page 10)

eral Motors at Bristol, Conn. He succeeds **Robert E. Waldo**, who has been granted a leave of absence.

John S. Liefeld, formerly with Aircraft Metal Forming Co., Burbank, Calif., has been appointed factory manager of Marquardt Aircraft Co., Van Nuys, Calif.

William H. Bennett has been promoted to director of engineering for Hydraulic Press Mfg. Co., Mt. Gilead, Ohio. He formerly was assistant sales manager.

Philip D. Doersam, formerly chief of the flight testing department of Hughes Aircraft Co., has been named manager of West Coast operations for Univox Corp. with offices in the new Los Angeles plant.

Sam R. Donaldson has been named superintendent of the newly formed Aircraft Division of Enamel & Heating Products Ltd., Sackville, N. B.

Jack D. Fuller has been named to head up the fuel technology section of Ethyl Corp. as manager. He has served as the firm's central region fuel technologist for four years. Three newly assigned technologists include: **C. Alon Cole** eastern region at New York, **Fred P. Robinson** central section at Chicago and **Martin L. Alspaugh** southern region at Tulsa.

Martin L. Garvey, Jr., has been named director of advertising and public relations for Reading Aviation Service, Inc., Pa. He previously was advertising and circulation manager of National Guardsman magazine.

Walter R. Fritts has joined Turnbull Enterprises, Inc., Baltimore, Md., aircraft crew seats, as quality control manager.

Dill Preston Van Duyn has been designated production manager for Texas Metal & Mfg. Co., Dallas.

Stanley Bogacyzk, director of supervisory training for Curtiss-Wright Corp., Wood-Ridge, N. J., has been named assistant director of industrial relations.

Karl D. Klein has been named general sales manager of Bowser Technical Refrigeration, Terryville, Conn., maker of low-temperature equipment and environmental test chambers. He replaces **Thomas Lopiccolo**, who has left the firm.

George C. Bond has been appointed general counsel for Pacific Airmotive Corp., Burbank, Calif., replacing **Charles Hamlin**, who resigned to enter private practice.

Honors and Elections

Alfred O. Quinn, head of the Engineering and Field Surveys Divisions of Aero Service Corp., Philadelphia, Pa., has been elected president of the American Society of Photogrammetry. **Arthur C. Lundahl**, assistant engineer for U. S. Navy Photo Interpretation Center, has been named first vice president of the society and **John I. Davidson**, chief of the Tri-Metrogon Mapping Section, Alaskan Branch of the U. S. Geological Survey, second vice president.

J. Fred Schoellkopf, IV, has been elected a member of the board of Bell Aircraft Corp., Buffalo, N. Y., succeeding his father, the late **Jacob F. Schoellkopf, Jr.**, a Bell director from 1936 until Dec. 1952.

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—JANUARY 26, 1953

AIRBORNE ACCESSORIES CORP. 4
Agency—Gray & Rogers Adv.
ALL AMERICAN ENGINEERING CO. 63
Agency—Ketchum, MacLeod & Grove, Inc.
ALLEN AIRCRAFT PRODUCTS, INC. 40
Agency—The Fred Rork Adv. Co.
ALLISON DIV., G.M.C. 68
Agency—H. L. Ross Advertising & Publicity
ALUMINUM CO. OF AMERICA 25
Agency—Fuller & Smith & Ross, Inc.
BOEING AIRPLANE CO. 30
Agency—N. W. Ayer & Sons, Inc.
BOOTS AIRCRAFT NUT CORP. 57
Agency—DeGarmo, Inc.
BOWER ROLLER BEARING CO. 54
Agency—MacManus, John & Adams, Inc.
BRAND & CO., INC., WM. 55
Agency—Cory Snow, Inc.
BREEZE CORP., INC. 51
Agency—Burke Dowling Adams, Inc.
BRUNSENE CO., THE, DIV. H. M. SAWYER & SON 22
Agency—Donald W. Gardner Adv., Inc.
CANNON ELECTRIC DEVELOPMENT CO. 28
Agency—Hixson & Jorgensen, Inc.
CARTER CO., J. C. 58
Agency—West Marquis, Inc.
CHAMPION SPARK PLUG CO. 66
Agency—MacManus, John & Adams, Inc.
CHASE AIRCRAFT CO., INC. 8
Agency—Geare-Marston, Inc.
CIBA COMPANY, INC. 43
Agency—Briggs & Varley, Inc.
CONSOLIDATED VULTEE AIRCRAFT CORP. 12
Agency—Buchanan & Co., Inc.
CORNELIUS CO. 31
Agency—Dwyer & Devoy Adv.
CROUSE HINDS CO. 24
Agency—Barlow Adv. Agency, Inc.
CURTISS WRIGHT CORP. 41
Agency—Burke Dowling Adams, Inc.
DARNELL CORP. LTD. 50
Agency—Henry L. Rhea Adv.
ECLIPSE-PIONEER DIV. BENDIX AVIATION CORP. 53
Agency—MacManus, John and Adams, Inc.
EX-CELL-O CORP. 67
Agency—Holden, Clifford, Flint, Inc.
FLYING TIGER LINE, INC. 60
Agency—Hixson & Jorgensen Adv., Inc.
GENERAL ELECTRIC CO. ..... Fourth Cover
Agency—G. M. Basford Co.
GOODRICH CO., B. F. 3
Agency—Batten, Barton Durstine & Osborn, Inc.
GRUMMAN AIRCRAFT ENG. CORP. ..... Front Cover
Agency—Fuller & Smith & Ross, Inc.
HAMILTON STANDARD PROPELLER DIV. UNITED AIRCRAFT CORP. 11
Agency—Lennen & Newell, Inc.
HARMAN EQUIPMENT CO. 63
Agency—Albert A. Drennan Adv. Agency
HUFFORD MACHINE WORKS ..... Third Cover
Agency—Clyde D. Graham Adv.
INDUSTRIAL TAPE CORP. 71
Agency—The Aitken Kynett Co.
INTERCONTINENTAL MFG. CO., INC. 83
Agency—Inter American Adv. Agency, Inc.
INTERNATIONAL NICKEL CO. 76
Agency—Marschalk & Pratt Co.
INTERNATIONAL RESISTANCE CO. 39
Agency—John Falkner Arndt & Co., Inc.
JAMES-POND-CLARK 64
Agency—Anderson-McConnell Adv. Agency
JOHNS MANVILLE CORP. 23
Agency—J. Walter Thompson Co.
KAISER METAL PRODUCTS, INC. 81
Agency—R. K. Davis & Bro.
MONADNOCK MILLS, UNITED CARR FASTENER CORP. 68
Agency—H. B. Humphrey, Alley & Richards, Inc.
MONSANTO CHEMICAL CO. 47
Agency—Gardner Advertising Co.
NORTH AMERICAN AVIATION CO. 80, 81
Agency—Batten, Barton, Durstine & Osborn, Inc.
O. K. TOOL COMPANY THE 44, 45
Agency—Peck Brothers Adv.
OTTO KONIGSLOW MFG. CO. 57
Agency—Fuller & Smith & Ross, Inc.
PACIFIC DIV. OF BENDIX AVIATION CORP. 62
Agency—The Shaw Company
PACKARD ELECTRIC DIV. G.M.C. 35
Agency—Campbell-Ewald Co.
PIASECKI HELICOPTER 93
Agency—R. K. Davis & Bro.
PIONEER PARACHUTE CO. 21
Agency—Julian Gross Adv. Agency
PITTSBURGH PLATE GLASS CO (FIBER GLASS DIV.) 37
Agency—Ketchum, MacLeod & Grove, Inc.
POLYKEN INDUSTRIAL TAPES DEPT. OF BAVER & BLACK 5
Agency—Leo Burnett Co., Inc.
RADIO CORP. OF AMERICA 69
Agency—J. Walter Thompson Co.
ROADCAP & ASSOCIATES, ROY R. 75
ROHR AIRCRAFT CORP. 32
Agency—Barnes Chase Co.
SCIAKY BROS., INC. 34
Agency—Russell T. Gray, Inc.
SCINTILLA MAGNETO DIV. BENDIX AVIATION CORP. 42
Agency—MacManus, John & Adams, Inc.
SEARCHLIGHT SECTION 84, 85, 86, 87, 88, 89, 90, 91
SENSENICH CORP. 75
Agency—Foltz-Wessinger, Inc.
SERVICE STEEL DIV. VAN PELT CORP. 62
Agency—Claude E. Whipple Adv.
SERVOMECHANISMS, INC. 36
Agency—Sanger-Funnell, Inc.
SIER-BATH GEAR & PUMP CO. 65
Agency—Thoma & Gill
STANDARD PRESSED STEEL CO. 29
Agency—Gray & Rogers Adv.
STEWART-WARNER CORP. 59
Agency—MacFarland, Aveyard Co.
STRATOS DIV., FAIRCHILD ENGINE & AIRPLANE CORP. 48, 49
Agency—Buchanan & Co., Inc.
SUNDSTRAND MACHINE TOOL CO. ..... Second Cover
Agency—Howard H. Monk & Associates
TEMCO AIRCRAFT CORP. 70
Agency—Taylor-Norsworthy, Inc.
TITEFLEX, INC. 73
Agency—John Falkner Arndt & Co.
TORRINGTON CO., THE 61
Agency—Hazard Advertising Co.
TRANS WORLD AIRLINES, INC. 79
Agency—Batten, Barton, Durstine & Osborn, Inc.
UNIVERSAL METAL PRODUCTS 64
Agency—Byran H. Brown & Staff
VICKERS, INC. 56
Agency—Witte & Burden Adv.
VOI-SHAN MFG. CO., INC. 33
Agency—Edward S. Kellogg Co.
WYLE LABORATORIES (MANTEC, INC.) 22
Agency—The Mayers Co., Inc.
WYMAN GORDON CO. 6
Agency—John W. Odlin Co., Inc.

SEARCHLIGHT SECTION

(Classified Advertising)

H. E. Hilty, Mgr.

EMPLOYMENT
Positions Vacant 84-88
Selling Opportunities Offered 84
Positions Wanted 84
Employment Agencies 84
EDUCATIONAL
Books 89
PLANES-EQUIPMENT
(Used or Surplus New)
For Sale 89-91

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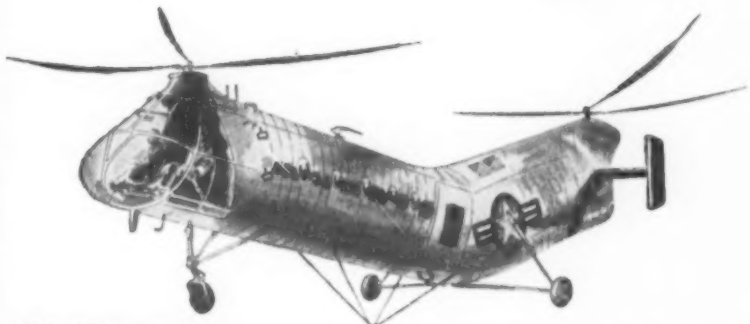

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EDITORIAL

Watch Those British!

The astonishing trend to aircoach by European airlines, reported in AVIATION WEEK's lead story today, will be watched closely by U. S. air carriers.

Our London correspondent, Nat McKitterick, reveals the significance of the most recent fare-cut announcements. These reductions, up to 30%, which will become effective this spring, actually account for 95% of the scheduled passenger air services on the continent, Mr. McKitterick discloses, which means that European carriers "plan an almost complete switch to aircoach."

British European Airways, directed by the canny Peter Masefield, not only will convert its present aircraft almost entirely to coach class, but it will also defy tradition by installing its newest, turbopropeller airliners as aircoaches, with 47 tourist-class seats, as the first models go into regular service about March.

No U. S. airline, of course, expects to have any jet plane carrying the public until 1956, if then (and these will be Pan American's British-built Comets), and no U. S. airline now anticipates use of turboprop aircraft at all, even as luxury liners. This despite the unanimous agreement in aviation that the jet is the plane of the future.

No one could be more proud of U. S. piston-engine airliners than we. Their speed, comfort, dependability and economic efficiency are unparalleled.

But many of us are becoming exceedingly uncomfortable as we watch the British design, develop, test and run up daily routine service time on revolutionary flying equipment such as the all-jet Comets and turboprop craft. These planes—and their air and ground crews—are piling up hours of experience that are worth perhaps as much money to the British as their costs of design and production.

These rewards from such unique experience are seldom assessed over here, but they represent return on the investment that is much larger than the momentary income from passengers and cargo.

Now the British—with two or three advanced transport models in the works—make an equally bold bid for patronage with BEA's sweeping conversion to low fares.

Everyone in aviation has preached to the public for so long the undeniable truth that the birth, development and service-testing of a new plane requires years of painstaking labor that it's no wonder the public asks in a rising crescendo where our first jet transport is being tested.

There are several factors in answering the public. The U. S. government has not subsidized development of commercial jet transports, and individual manufacturers have refused to invest their own money in jet prototypes. Allison and Consolidated Vultee have developed and are testing a turboprop Convair, but there are no orders for these as yet.

Our manufacturers, further, have complained that the airlines have not been able to say what kind of jet airliners they would want. The airlines admit this is true, but expect the manufacturers to tell them in somewhat accurate detail what versions they can build. No manufacturer here has been able to promise jet aircraft as economical as our best piston-engine airliners will be within a year.

Then, like the problem before the military services in the dynamic fields of high-speed jet planes and guided missiles, developments are moving so rapidly that now, more than ever, each project is obsolescent before it is completed. The temptation is always to wait a bit longer, for the lessons from the newest test, which may short-circuit time.

Where finances are closely watched, as in the relatively small commercial aircraft field, this temptation is almost overpowering. Any builder who launches a jet airliner at stratospheric cost stands a dangerous risk of being outdated by the manufacturer who starts six months later and may, by capitalizing on latest perfections in the art, catch up or move ahead.

We do not envy either the American carriers or the American aircraft makers. But we do know that Britain already is five to seven years ahead of us in jet transports—because British government money ordered the planes—and the longer we wait the more aircraft they build, the more advanced designs they can develop from that precious experience that only they are piling up. And the farther behind them we must fall.

The British, we fear, have better vision than we. They have realized that this aviation business has only started. They are sinking money in it and expect to win back returns on their investment, in the usual British style.

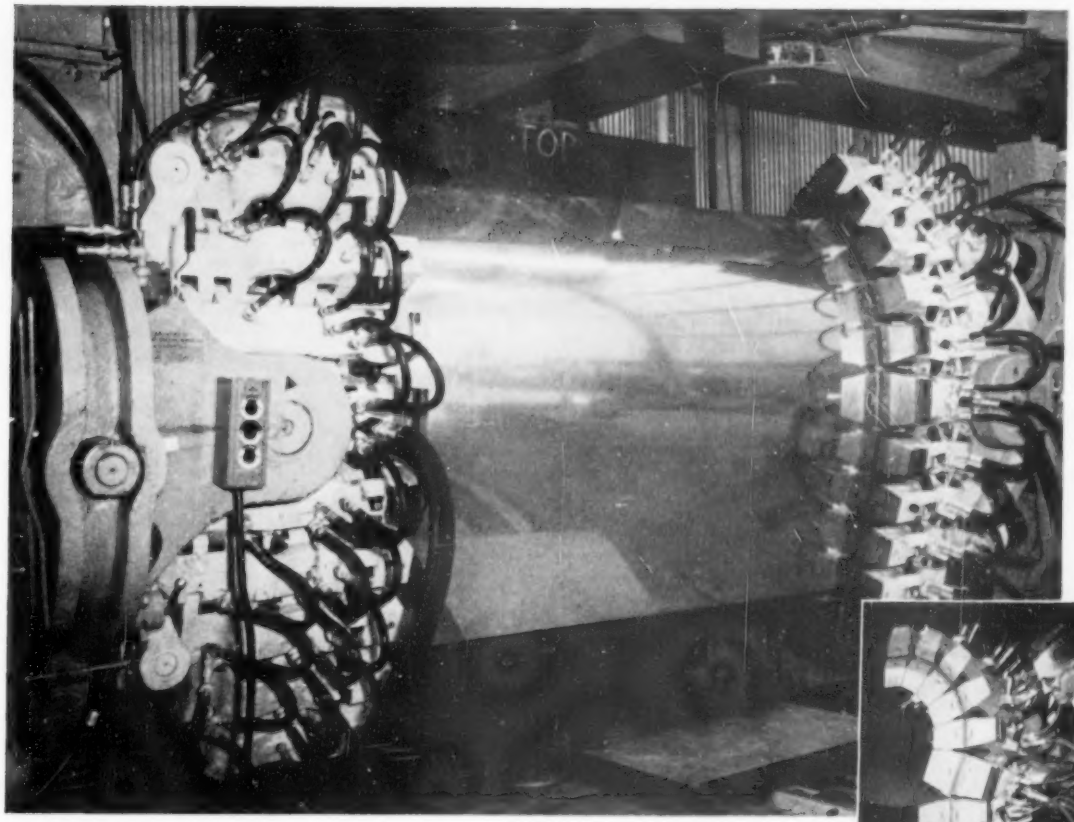
We have been underestimating the future of aviation, with our smug attitude that it isn't worth developmental subsidies. Don't we think those subsidies would pay off, many times over? In peace as well as in war? We had better learn from the British—and act, fast.

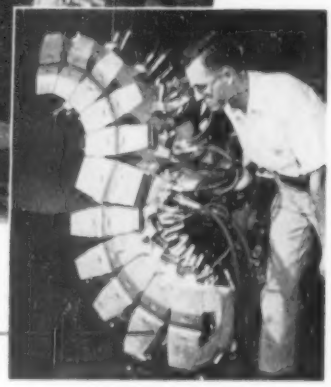
Thought for the New Year

A paragraph from a recent address by the Air Force's Vice Chief of Staff, Gen. Nathan F. Twining, should be emblazoned on the office wall of every Air Force, Navy, airline and aircraft office in the country:

"If we Americans ever get to the point where we shudder at each new invention of science instead of rejoicing in it; where we question the value of progress in our mastery of the forces of nature and quibble endlessly over the cost of progress; where we worry more and more about the possible misuse of each new scientific or mechanical development and show less and less enthusiasm for the wider opportunities offered by these new attainments—then indeed our days of greatness are over and defeat is but a matter of time."

Aviation leaders, take note! —Robert H. Wood





This curve is starting a revolution!

Hufford HYDRA-CURVE JAWS widen stretch-wrap forming applications.

Here's a revolution in the making—a new tool that not only cuts costs on many vital sheet stretch-wrap forming operations but does jobs that can't be done by conventional means!

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What you gain—This pre-curving not only permits deeper curves to be shaped, but does so with considerable savings in stock! Sheets no longer must make the exaggerated transitions from a straight jaw to deep convexities or concavities of a die. Fewer wrinkles develop; require less stretching to remove. Scrap losses are negligible.

Big material savings—Outstanding advantage is savings in sheet stock—as high as 30% in extreme cases, depending on die. *Material savings alone amount to several hundreds of dollars daily* in one user's plant.

Lower labor costs—Parts heretofore difficult or impossible to stretch-wrap form are now made with comparative ease. Excellent skin fits on these parts cut assembly hours, adding to plane output.

Saves furnace hours—Many parts can now be satisfactorily stretch-wrap formed from material in the "ST" condition.

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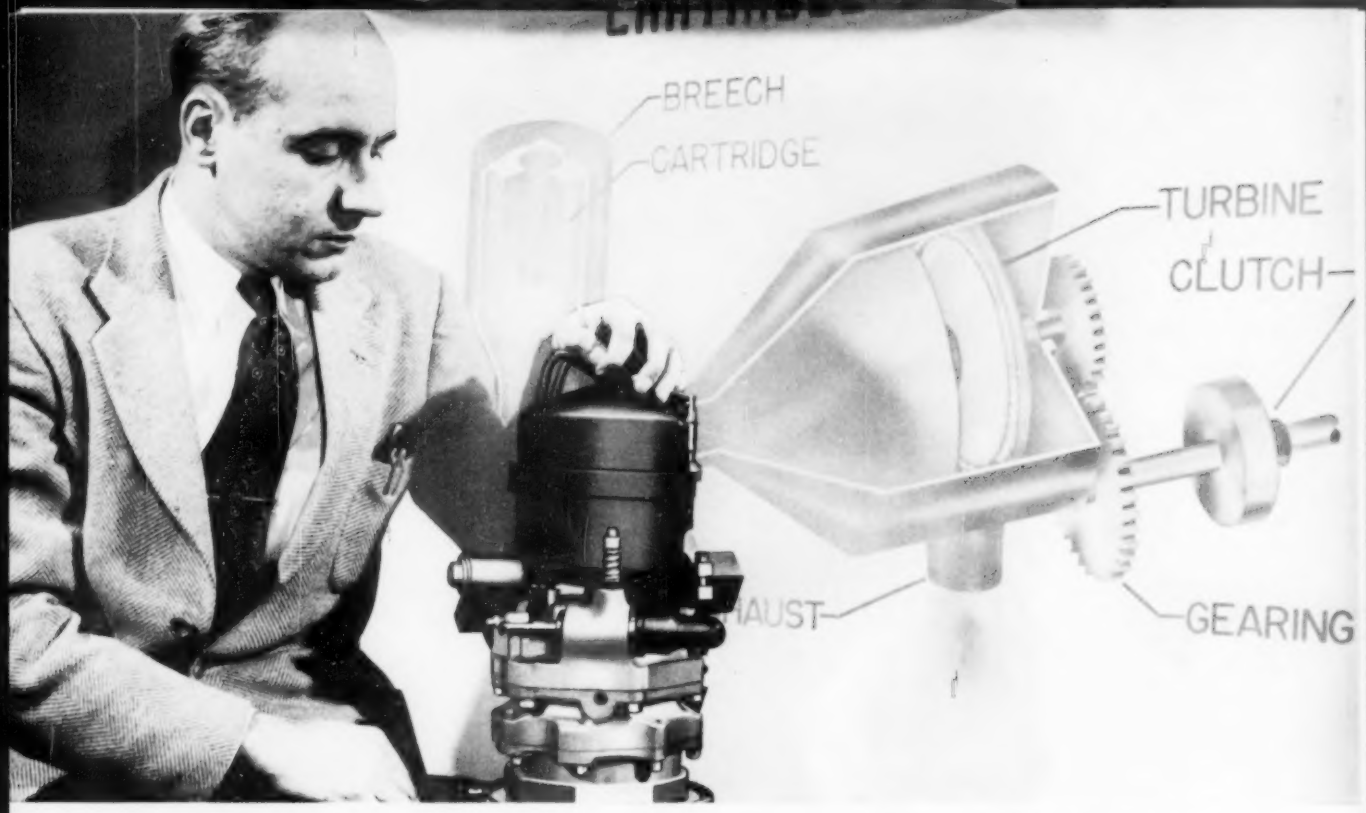

New G-E Gas Turbine Starters Give Jet Engines Fast Starts Without Ground Power

Small, Compact Starters Meet Wide Range of Engine Torque Requirements

Now jet engines can be started quickly and simultaneously without need of ground power! G-E's new gas turbine starters eliminate ground power and permit complete self-starting of jet airplanes. Attached to the jet engine itself, these small, compact starters are operated by a push-button in the pilot's compartment. Just seconds after the pilot pushes the starter button, the jet engine is at idling speed.

Energy for the start can be provided by several possible power sources. In the solid propellant ("cartridge") system, energy for the start is supplied by a solid propellant charge looking very much like an artillery shell. The charge is inserted into a breech and ignited electrically. When cartridge combustion is complete, the starter automatically de-clutches. Breech assemblies can be designed to hold as many supplementary cartridges as desired.

Another alternative is the fuel-air combustion system. Essentially the same cycle takes place except that the energy for the start is supplied by compressed air mixed with jet engine fuel.

For further information on aircraft gas turbine starters, contact your nearest G.E. aviation specialist or fill out the coupon and send to General Electric Co., Section 210-64, Schenectady 5, N. Y.

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